Chromosomes and genetic information

Definitions

Karyotype: *The arrangement of chromosomes in cells in descending order according to their size and number.*

Chiasma: *The points of connection of internal chromatids in homologous chromosomes pairs.*

Crossing over: *The exchange of parts of internal chromatids of homologous chromosomes pairs.*

Give reasons for

1- Chromosomes pair (23) is called sex chromosomes
Because this pair carries the genetic information responsible for the determination of sex (male or female).

2- The assortment (distribution) of genes in gametes is independent according to Mendel's second law
Because every gene exists on an independent chromosome

3- Thomas Morgan's hypothesis on inheritance contradicts with Mendel's second law of the independent assortment of hereditary factors
Because Mendel's law states that hereditary factors (genes) are inherited independently of the other factors, while Thomas Morgan supposed that genes on the same chromosome are inherited as a single unit.

4- The importance of crossing over phenomenon
Because it causes the variation of hereditary traits of the members of same species, which helps them in the adaptation with environment conditions, and the development and continuation of their life.

Questions

1- Choose the correct answer

1- In human, nucleus of each somatic cell contains ………. pairs of chromosomes
A- 23 B- 46 C- 37 D- 15

2- In human, nucleus of each somatic cell contains ………. of chromosomes
A- 46 B- 37 C- 23 D- 18

3- Chromosomes pair number …… is called sex chromosomes.
A- 15 B- 17 C- 9 D-23

4- Sex chromosomes pair in male is ……………..

A- XX B- XY C- YY D- XXY

5- Sex chromosomes pair in female is …………….
A- XX B- XY C- YY D- XXY

6- Scientist/s ………….. discovered that genes on the same chromosomes are not inherited independently, but as single unit.
A- Gregory Mendel B- Boveri and Sutton C- Thomas Morgan D- Darwin

7- Scientist/s ………. formulated the chromosomal theory.
A- Boveri and Sutton B- Thomas Morgan C- Mendel D- Leeuwenhoek

8- Homologous chromosomes approach to each other forming tetrad in stage ………. of meiosis
A- Prophase I B- Prophase II C- Anaphase I D- Anaphase II

9- The points of connection of internal chromatids in homologous chromosomes pairs is called ……….
A- Chiasma B- Chromosome C- Centromere D- Centrosome

10- In gametes, chromosomes which didn't undergo crossing over are called ….
A- New chromosomes B- Building chromosomes C- Parental chromosomes D- Chromatids

<u>2- Write the scientific term</u>

1- The arrangement of chromosomes in cells in descending order according to their size and number.

2- The points of connection of internal chromatids in homologous chromosomes pairs.

3- The exchange of parts of internal chromatids of homologous chromosomes pairs with their genes.

4- Chromosomes which didn't undergo cross over in gamete cells during meiosis.

5- Chromosomes which didn't undergo cross over in gamete cells during meiosis.

<u>3- Write one work of each one of the following scientists</u>

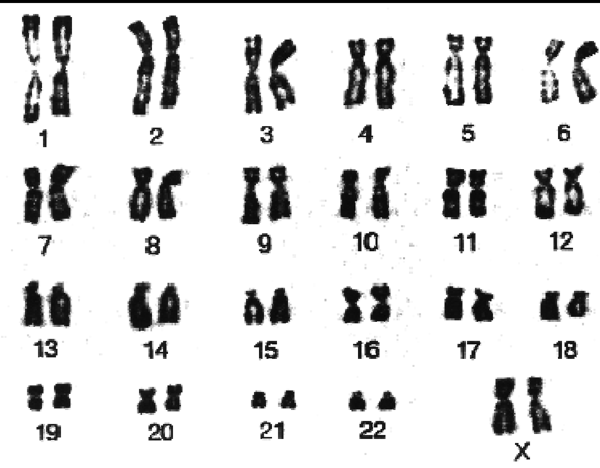
1- Boveri and Sutton
2- Thomas Morgan

<u>4- Write short notes about</u>

1- Chromosomal theory
2- Chromosomal maps

3- Complete linkage
4- Karyotype

5- The following figure describe Karyotype of a cell, answer the questions

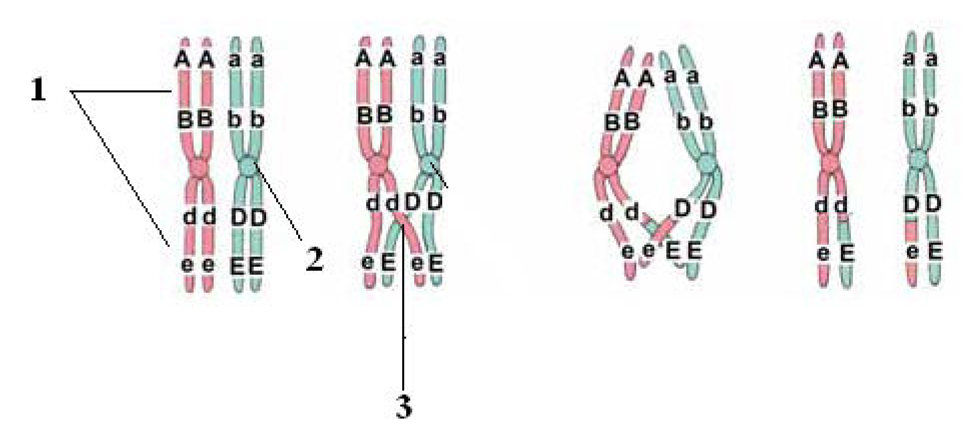


1- What does this Karyotype describe, a somatic cell or gamete? Why?

2- What is the sex of the person carrying this Karyotype ? Why?

3- What is the number of somatic and sex chromosomes?

6- The following figure describe a very important phenomenon



1- What is the name of this phenomenon, when does it happen?

2- Label the numbers (1), (2), (3)

3- Mention the genotypes of gametes resulted from this phenomenon.

The Answers

1- Choose the correct answer

1- 23 6- Thomas Morgan

2- 46 7- Boveri and Sutton

3- 23 8- Prophase I

4- XY 9- Chiasma

5- XX 10- Parental chromosome

2- Write the scientific term

1- Karyotype 4- Parental chromosomes

2- Chiasma 5- New chromosomes

3- Crossing over

3- Write one work of each one of the following scientists

*1- **Boveri and Sutton**: They put chromosomal theory in 1902*
*2- **Thomas Morgan**: He noticed while studying Drosophila in 1911 that genes on the same chromosome are inherited as one unit not independently*

4- Write short notes about

1- See page (3)
2- See page (9)
3- See page (6)
4- See page (2)

5- The following figure describe Karyotype of a cell, answer the questions

1- Somatic cell, because it contains 23 pairs of chromosomes (diploid cell 2n)

2- Female, its sex chromosome is homologous (XX)

3- Somatic chromosomes: 44 (22 pairs) Sex chromosomes: 2 (1 pair)

6- The following figure describe a very important phenomenon

1- Crossing over, prophase I of meiosis

2- (1) Chromatid (2) Centromere (3) Chiasmus

3- (ABde) (ABdE) (abDe) (abDE)

The interaction of genes

Definitions

Lack of dominance: *A form of inheritance in which no genes dominate over the other one, but they interact forming new trait*

Antigens: *They are chemical substances which exist on the surfaces of red blood cells, they play an important role in blood transfusion process.*

Antibody: *They are antibodies of antigens which exist in blood plasma, they play an importance role in blood transfusion process*

Rhesus factor: *A kind of antigens which exists on the surfaces of red blood cells of most humans, its inheritance is controlled by three pairs of genes which are carried on one chromosome pair.*

Complementary genes: *Genes which interact with each other causing the appearance of a hereditary trait.*

Lethal genes: *Genes which obstruct growth and cause death at different ages when they exist in pure (homozygous) form*

Give reasons for

1- When two individuals different in one pair of hereditary traits copulate, the second generation ratio is 1:2:1 not 1:3

Because the genes of those different traits do not dominate over each other. So, they interact with each other forming new trait, which appears in 2^nd^ generation with the two opposite traits at ratio 1:2:1 (not 1:3 – as Mendel laws state – because of the lack of dominance)

2- The importance of blood groups

Because they :-

- Solve problems of the determination of paternity (parents of children) and pedigree of children (blood groups denies pedigree but don't prove it)
- Determine blood transfusion processes between individuals.
- Are used in the study of human races classification and evolution

3- Blood group (O) is a universal donor, while blood group (AB) is a universal recipient

Blood group (O) is a universal donor because it has both antigen-a and antigen-b and doesn't have any antibodies, which makes it capable of giving blood to all groups. While blood group (AB) is a universal recipient because it has both anti-a and anti-b and doesn't contain any antigens, which makes it capable of receiving blood from all types.

4- Giving blood of inconvenient group to a recipient person is very dangerous.
Because giving blood to a person of a blood group unsuitable for his blood causes the break of red blood cells, which cause sickness, chest pain, irregular heartbeat, blueness, headache, and even death!!

5- Blood should be examined before transfusion process
To make sure it is convenient for the blood of recipient person and doesn't contain any disease-causing organisms (Ex. Viruses)

6-The importance of determination of rhesus factor in blood
Because it is very important to determine it before blood transfusion process and marriage; in order to prevent the formation of antibodies of Rh factor antigens, which breaks red blood cells.

7- Woman who was pregnant with a baby of different rhesus factor should take vaccine within 72 hours after every delivery
To break up the amount of blood mother had taken from her first fetus – which contains Rh+ - before her immune system forms Rh antibodies. Which protects her second fetus.

8- Inner cabbage leaves are not green-coloured
Because the gene responsible for chlorophyll formation in green plants (which give them its green colour) needs light; so that its effect will appear. But we find that inner cabbage leaves are not exposed to light.

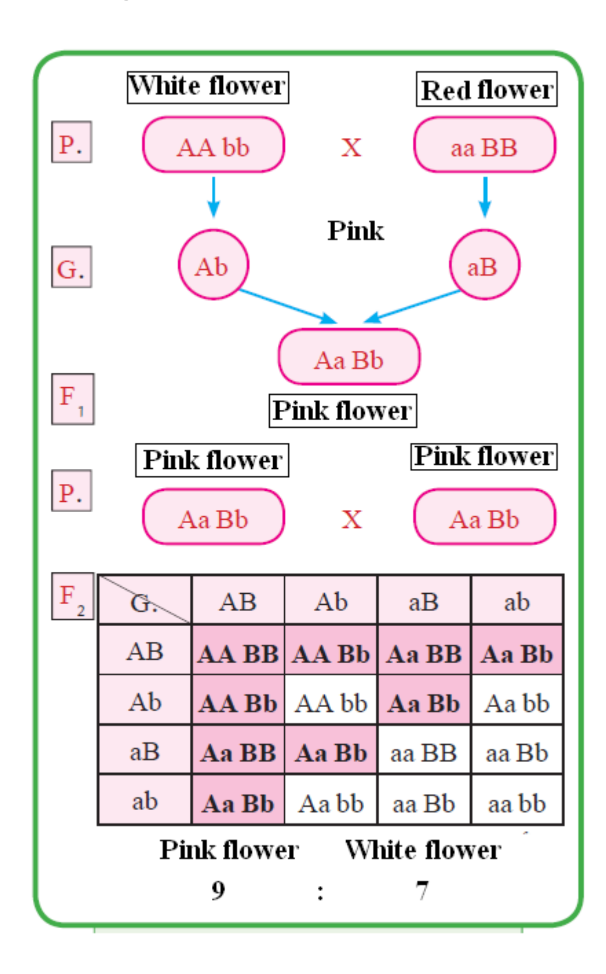
What happens when

1- Transfusing blood from a man of group (AB) to another one of group (A)
This will break red blood cells of the recipient person because his blood produces anti-b for antigens-B of blood group (AB), which causes shivering in body, chest pain, blueness, irregular heartbeat, headache, low blood pressure

2- (Rh-) woman married (Rh+) man (with respect to the first and second babies)
When the woman becomes pregnant with the first baby (which is Rh+), a part of his blood transfers from him to his mother, which stimulates her immune system to produce antibodies of Rh factor antigens. If mother wasn't given vaccine after delivery of the first baby, and became pregnant again with another baby, Rh+ blood transfers from mother to her second baby through placenta, which breaks up his red blood cells and causes him acute anemia and even death.

3- Two sweet pea plants with white flowers whose genotypes are (aaBB) and (AAbb) copulate (first and second generations)

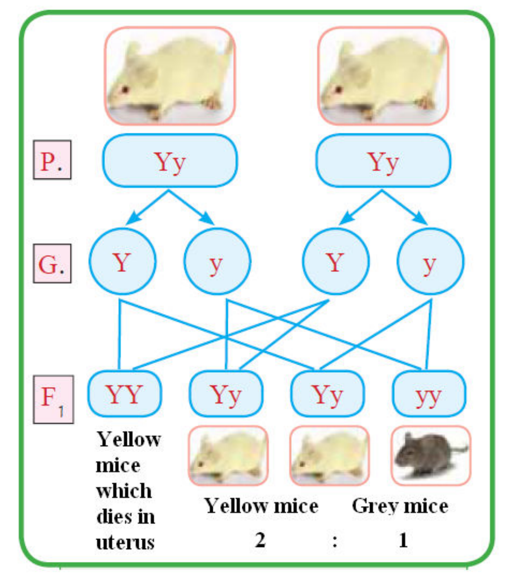
100% pink flowers are produced in the first generation, while both pink and white flower appear in the second generation at ratio 9:7



G.	AB	Ab	aB	ab
AB	**AA BB**	**AA Bb**	**Aa BB**	**Aa Bb**
Ab	**AA Bb**	AA bb	**Aa Bb**	Aa bb
aB	**Aa BB**	**Aa Bb**	aa BB	aa Bb
ab	**Aa Bb**	Aa bb	aa Bb	aa bb

4- Breeding two yellow mice (Yy)

Hybrid yellow and black mice are produced at ratio 2:1 respectively, pure yellow mice (YY) - which represent 25% of the generation – die in uterus before being born.



5- Planting corn plant seedlings in a dark place

Seedlings lose their green colour due to the lack of chlorophyll, as the gene responsible for chlorophyll formation is activated only by light (which is absent)

Questions

1- Choose the correct answer

1- in lack of dominance case, the ratio of 2^{nd} generation resulted from the copulation of two individuals different in one pair of opposite traits is ………..
A- 1:3 B- 1:2:1 C- 7:9 D- 1:2

2- When a man of blood group (AB) marries a woman of blood group (O), the ratio of children which have blood group (O) is ……..
A- 0% B- 50% C- 25% D- 75%

3- Blood group which has both types of antigens is……
A- A B- O C- AB D- B

4- Blood group which has both types of antibodies is…..
A- A B- O C- AB D- B

5- Blood group which is known as "Universal recipient" is
A- A B- O C- AB D- B

6- Blood group which is know as "Universal donor" is……
A- A B- O C- AB D- B

7- Trait of flower colour of sweet pea plant is an example on ……….
A- Lack of dominance B- Alleles multiplicity C- Complementary genes
D- Lethal genes

8- The inheritance yellow mice colour is an example on …………
A- Lack of dominance B- Alleles multiplicity C- Complementary genes
D- Lethal genes

9- ……… gene is an example on recessive lethal genes
A- Yellow colour of mice B- Infantile dementia C- Turner's syndrome
D- Bulldog race in cow

10- ….. is an example on dominant lethal genes
A- Yellow colour of mice B- Infantile dementia C- Turner's syndrome
D- Bulldog race in cow

2- Write the scientific term

1- A form of inheritance in which no genes dominate over the opposite one, but they interact forming new trait

2- chemical substances which exist on the surfaces of red blood cells, they play an important role in blood transfusion process.

3- A kind of antigens whose inheritance is controlled by three pairs of genes which are carried on one chromosome pair.

4- Genes which interact with each other causing the appearance of a hereditary trait.

5- Genes which obstruct growth and cause death at different ages when they exist in pure (homozygous) form

3- Write short notes about:-

1- Dangers of blood transfusion
2- Rhesus factor
3- Lethal genes
4- Complementary genes

4- Compare between

1- Blood types (A) and (B)
2- Lethal and complementary genes

5- Rationalize the following cases on a genetic basis

1- A man of blood group (A) married a woman of blood group (B) and bore a child of blood group (O)

2- A woman whose blood group is (AB) has a son of the same blood group, what are the probable genotypes of the father?

3- Breeding four o'clock plant with red flowers with another one of pink flowers.

6- The following table illustrates the generation resulted from the breeding of two sweet pea plants, then answer the following questions

♀ \ ♂	AB	--	aB	ab
--	**(1)**	AABb	**(2)**	AaBb
--	**(3)**	AAbb	**(4)**	Aabb

1- What are the genotypes of (1), (2), (3), (4)
2- Find the genotypes of the parents
3- What is the percentage of white flowers in this generation?
4- What is the colour of flowers produced from the breeding of plant (4) with (3)

7- If your blood group is (A) and you need blood transfusion, which blood groups are suitable for you? Why?

8- Answer the following question

Group	anti-a	anti-b
....		
....		
....		
....		

1- Complete the previous table mentioning blood groups

2- Which blood group has both types of antigens?

3- Which blood group has both types of antibodies?

Answers

1- Choose the correct answer

1- 1:2:1 6- O

2- 0% 7- Complementary genes

3- AB 8- Lethal genes

4- O 9- Infantile dementia

5- AB 10- Yellow colour of mice

2- Write the scientific term

1- Lack of dominance 2- Antigens 3- Rhesus factor

4- Complementary genes 5- Lethal genes

3- Write short notes about:-

1- Giving blood to a person of an inconvenient group causes headache, shortness of breath, chest pain, irregular heartbeat, blueness, shivering in body and usually ends with death. Transfusing polluted blood to a person may cause viral infection (Ex. AIDS – Hepatitis B)

2- Rhesus factor is a kind of antigens which exist on the surfaces of red blood cells of 85% of humans, its inheritance is controlled by 3 pairs of genes which exist on one chromosome pair.

3- Lethal genes are genes which obstruct growth and cause death to living organisms if they are present in pure (homozygous) form. There are recessive lethal genes (such as the genes causing the absence of chlorophyll in corn plants and infantile dementia in humans) and dominant lethal genes (such as the genes of yellow colour of mice and bulldog race in cows)

4- Complementary genes are genes which interact together forming a certain trait. The appearance of this trait is controlled by two pair of genes, there must be at least one dominant gene in each pair so that the dominant trait appears. Otherwise, recessive trait will appear. The flower colour of sweet pea plant is an example of complementary genes

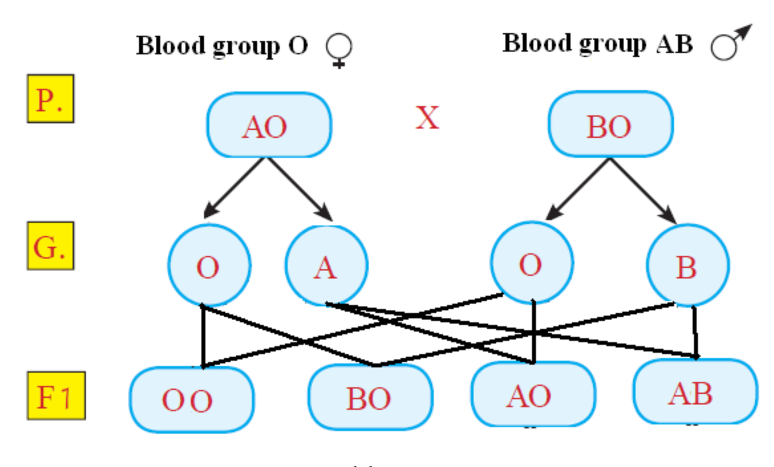
4- Compare between

P.O.C	***Blood type (A)***	***Blood type (B)***
Genotype	*AA – AO*	*BB – BO*
Antibody	*Anti-b*	*Anti-a*
Antigen	*Antigen-a*	*Antigen-b*
Receives blood from	*Blood types (A) and (O)*	*Blood types (B) and (O)*

Lethal genes	***Complementary genes***
- They are genes which obstruct growth and cause death to living organisms if they are present in a pure form	*- They are genes which interact together forming hereditary trait*
- Ex. Infantile dementia gene in humans	*- Ex. Flower colour trait of sweet pea*

5- Rationalize the following cases

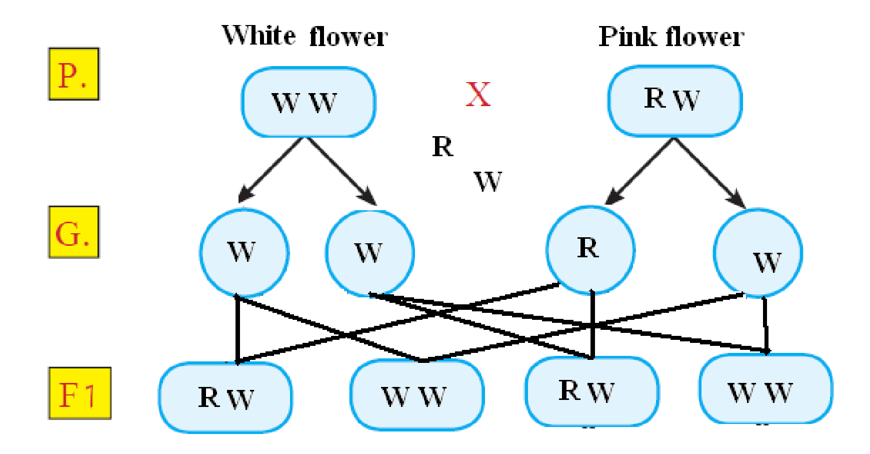
Case (1)



Case (2)

Genes forming blood type (AB) are (A) and (B)
Thus, father should have at least one of those genes in his blood type
Probable genotypes of father are (AO) – (AA) – (AB) – (BO) – (BB)

Case (3)



<u>6- The following table illustrates the generation resulted from the breeding of two sweet pea plants, then answer the following questions</u>

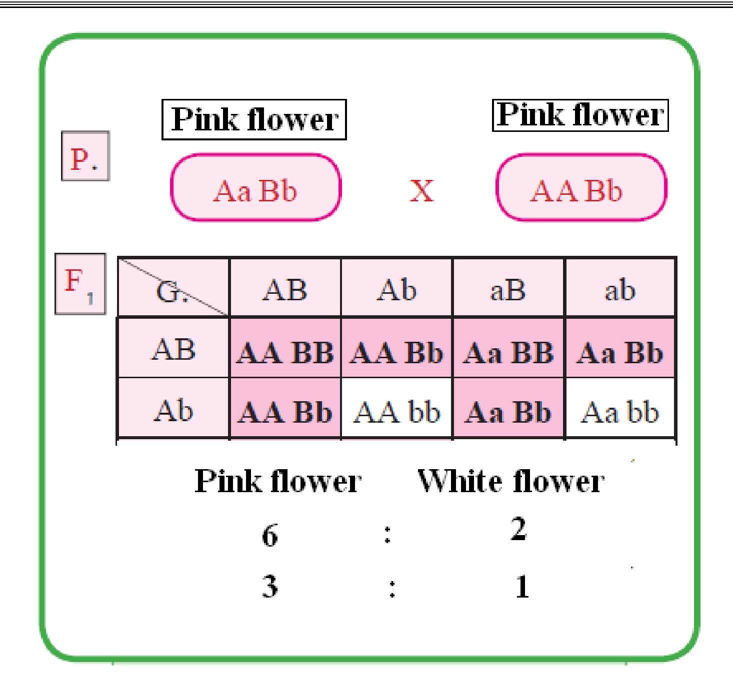
♀ \ ♂	AB	Ab	aB	ab
AB	**(1)**	AABb	**(2)**	AaBb
Ab	**(3)**	AAbb	**(4)**	Aabb

1- (1) AABB
(2) AaBB
(3) AABb
(4) AaBb

2- Genotype of 1st parent: AaBb
Genotype of 2nd parent: AABb

3- 25%

4- 75% Pink flowers
25% white flowers



7- Blood of groups (A) and (O) will be suitable because group (A) has antigen-a and anti-b like my own blood group, and (O) group has no antigens and both a-anti and b-anti

8-

Group	anti–a	anti–b
B		
A		
O		
AB		

2- (AB) group

3- (O) group

Genetic inheritance and diseases

Definitions

Klinefelter's syndrome: *Genetic disorder caused by the increase of sex chromosome (X) in some males (XXY + 44)*

Turner's syndrome: *Genetic disorder caused by the decrease of chromosome (X) in some females (XO+44)*

Down's syndrome: *Genetic disorder caused by the existence of an additional chromosome in chromosome pair (21)*

Sex-linked traits: *They are traits whose genes are carried on sex chromosomes , but their appearance is not affected by sex hormones.*

Sex-influenced traits: *They are traits whose genes are carried on somatic chromosomes, and their appearance is affected by sex hormones.*

Hemophilia: *Genetic disease which causes the inability of body to control blood clotting process – the process which stops bleeding*

Sex-limited traits: *They are traits which appear in one of the two sexes only due to the difference in sex hormones*

Albinism: *Genetic disorder which causes the absence of melanin pigments from the cells of hair, eye lashes and skin*

Pedigree: *Diagram which represents hereditary data which explains how a certain trait is inherited, and used in tracing different hereditary traits*

DNA fingerprint: *A method used to recognize a person by the comparison of his DNA sequences*

Give reasons for

1- A Sperm determines the sex of fetus not ovum

Because there are two kinds of sperms – a kind carrying (X) sex chromosome and another one carrying (Y) sex chromosome, while ova have only one kind (which carries X sex chromosome). When a sperm carrying (Y) chromosome fertilizes an ovum of (X) chromosome, a male fetus (XY) is formed, while when a sperm of (X) chromosome fertilizes an ovum, a female fetus (XX) is formed.

2- A male with Klinefelter's syndrome is infertile and has feminine traits

Because it has an additional (X) sex chromosome in his Karyotype, which causes the disorder of sex hormones, as there are female sex hormones on (X) chromosome

3- A female with Turner's syndrome cannot hit puberty

Due to the lack of female sex hormones responsible for puberty, as this female has only one (X) sex chromosome instead of two.

4- Klinefelter's syndrome affects males only

Because Klinefelter's syndrome is caused when an abnormal ovum having 2 (X) chromosome (XX+22) is fertilized by a sperm (Y+22), which forms a male zygote of Karyotype (XXY+44)

5- Turner's syndrome affects females only

Because Turner's syndrome is caused when an abnormal ovum with no X chromosomes (O+22) is fertilized by a sperm (X+22), which forms a female zygote of Karyotype (XX+44).

6- Eye colour of Drosophila insect is from sex-linked traits

Because eye colour trait of Drosophila insect exists on sex chromosomes, and not affected by sex hormones

7- Colour blindness is more common in males than females

Because colour blindness trait gene is carried on one (X) sex chromosome in males, while it has two genes carried on (XX) sex chromosomes in females. And as we know, a males carries only one (X) chromosome, while a woman carries two (X) chromosomes, so colour blindness is more common in men.

8- Males cannot inherit colour blindness from their fathers

Because they inherit sex chromosomes (Y) from father, not chromosome (X) on which colour blindness gene is carried.

9- Both females and males can inherit colour blindness from their mothers

Because both of them inherit chromosome (X) from mother – the chromosome on which colour blindness gene is carried

10- A man with genotype (B+B) is infected with baldness, while a female with the same genotype has normal hair
Because baldness is from sex-influenced traits, so its gene is only affected by male sex hormones

11- Scientists find it hard to study the inherited traits and how they transfer to human.
Due to:-
- The long time between a generation and another one
- The small number of individuals resulted from every marriage

12- Pedigree is from the most important methods in human genetics
Because:-
1- It explains how a certain trait is inherited in a certain family
2- It is used to trace different hereditary traits (especially those linked to genetic diseases and disorders)
3- It is used for prediction of the probability of appearance of these traits in coming generations

13- The importance of DNA analysis (gene map)
Because this map can help us determine the diseases with by which human may be infected in the future.

14- The spread of genetic diseases and disorders
Due to:-
1- Marriage of relatives
2- Getting married without carrying out medical tests

15- The importance of carrying out medical tests before marriage
Because medical tests help in:-
- Having healthy children
- Limiting the spread of genetic diseases, congenital disorders and mental retardation
- Avoiding social, psychological and financial problems resulted from taking care of children with genetic diseases

16- DNA fingerprint plays an important role in the field of medicine
Because:-
- It is used in the study of genetic diseases
- It is used in tissues transplantation process

17- Amniotic fluid testing is very important during pregnancy
Because it helps us determine the diseases caused by the increase or decrease of the no. of chromosomes (Ex. Down syndrome – Klinefelter's syndrome – Turner's syndrome), as we can get photos of these chromosomes and make Karyotype for the fetus.

18- The importance of DNA fingerprint in forensic science
Because:-
- It helps in recognizing deformed dead bodies and tracking lost children
- It helped courts begin investigations in crimes whose offenders were unknown.
- It acquitted hundreds of people who were accused of rape and murder crimes and convicted others
- It plays an important role in parentage cases

19- The importance of genome in human genetics
Because scientists aim to use genome in :-
- The manufacture of drugs without side effects
- The study of evolution of living organisms by comparing human genome to that of other organisms
- Improving offspring by determining the genes causing diseases in the fetus before its birth and improving them

What happens when

1- A sperm (Y+22) fertilizes an ovum (X+22)
A male zygote (XY+44) is formed

2- A sperm (X+22) fertilizes an ovum of the same Karyotype
A female zygote (XX+44) is formed

3- A sperm (Y+22) fertilizes an abnormal ovum (XX+22)
A male fetus (XXY+44) suffering from Klinefelter's syndrome is formed, which makes him infertile and causes the appearance of some feminine traits, tall stature, growth of limbs more than average rate and mental retardation due to the disorder of sex hormones.

4- A sperm (X+22) fertilizes an abnormal ovum (O+22)
A female fetus (XO+22) suffering from Turner's syndrome is formed, which makes her unable to hit puberty due to the lack of hormones and causes short stature, slow mental development, and congenital disorders in heart and kidneys.

5- The fertilization of a gamete carrying a complete pair of chromosome in pair (21)

A male fetus (XY+45) or female fetus (XX+45) suffering from Down syndrome is formed (because of having 3 copies of chromosome 21), which causes mental retardation, short stature, oval face, flat head back, short fingers and toes, small ears and narrow eyes

Comparison

Point of comparison	Sex-linked traits	Sex-influenced traits	Sex- limited traits
Definition	*They are traits whose genes are carried on sex chromosomes , but their appearance is not affected by sex hormone*	*They are traits whose genes are carried on somatic chromosomes, and their appearance is affected by sex hormone*	*They are traits which appears in one of the two sexes only due to the difference in sex hormone*
Examples	*Eye colour of Drosophila*	*Baldness / Hemophilia*	*Milk production n females*

Point of comparison	Down syndrome	Klinefelter's syndrome	Turner's syndrome
Karyotype	*(XX + 45) or (XY+45)*	*(XXY + 44)*	*(XO+44)*
Causes	*The fertilization of a gamete carrying a complete pair of chromosome (21)*	*The fertilization of an abnormal ovum (XX+22) by a sperm (Y+22)*	*The fertilization of an abnormal ovum (O+22) by a sperm (X+22)*
Symptoms	*- Mental retardation - Narrow eyes - Short stature - Short toes and fingers - Flat head back - Delayed growth - Oval face - Small ears*	*- Infertile male - The appearance of feminine traits (growth of breast) - Tall stature - Mental retardation - Overgrowth of limbs*	*- Female's inability to hit puberty - Congenital disorders in kidneys and heart - Short stature*

Questions

1- Choose the correct answer

1- The Karyotype of male cell is …………….
A- XX + 44 B- XY+44 C- XO + 44 D- XXY + 44

2- The Karyotype of female cell is ………
A- XX + 44 B- XY+44 C- XO + 44 D- XXY + 44

3- Karyotype of Klinefelter's syndrome is …….
A- XXY + 44 B- XO +44 C- YO + 45 D- XY + 45

4- Karyotype of Turner's syndrome is …………….
A- XXY + 44 B- XO +44 C- YO + 45 D- XY + 45

5- Down syndrome is caused by the fertilization of an ovum (X+22) with sperm
A- X + 23 B- Y + 23 C- X + 22 D- Y+22

6- ………. affects males only
A- Turner's syndrome B- Klinefelter's syndrome C- Down syndrome D- Hepatitis

7- ……… affects females only
A- Turner's syndrome B- Klinefelter's syndrome C- Down syndrome D- Hepatitis

8- ………. is also known as Mongolism
A- Turner's syndrome B- Klinefelter's syndrome C- Down syndrome D- Hemophilia

9- The eye colour of Drosophila insect is an example on ……….. traits
A- Sex-linked B- Sex-influenced C- Sex-limited D- Mendilian

10- Colour blindness trait is an example on ………….. traits
A- Sex-linked B- Sex-influenced C- Sex-limited D- Mendilian

11- When a sound male and a female infected with colour blindness marry, the appearance of this case will be in …………..
A- All males B- All females C- Half the males D- Half the females

12- Hemophilia is an example on ………….. traits
A- Sex-linked B- Sex-influenced C- Sex-limited D- Mendilian

13- Growth of beards in males in an example on ………. Traits
A- Sex-linked B- Sex-influenced C- Sex-limited D- Mendilian

14- Genetic disorder which causes the absence of melanin pigments in human body is called ………..
A- Albinism   B- Hemophilia   C- Polydactyl   D- Baldness

15- DNA fingerprint was discovered by scientist ……..
A- Gregory Mendel   B- Watson and Creek   C- T. Morgan   D- Alec Jeffreys

2- Write the scientific term

1- Genetic disorder caused by the increase of sex chromosome (X) in some males (XXY + 44)

2- Genetic disorder caused by the decrease of chromosome (X) in some females (XO+44)

3- Genetic disorder caused by the existence of an additional chromosome in chromosome pair (21)

4- They are traits whose genes are carried on sex chromosomes , but their appearance is not affected by sex hormones.

5- They are traits whose genes are carried on somatic chromosomes, and their appearance is affected by sex hormones.

6- Genetic disease which causes the inability of body to control blood clotting process – the process which stops bleeding

7- They are traits which appear in one of the two sexes only due to the difference in sex hormones

8- Genetic disorder which causes the absence of melanin pigments from the cells of hair, eye lashes and skin

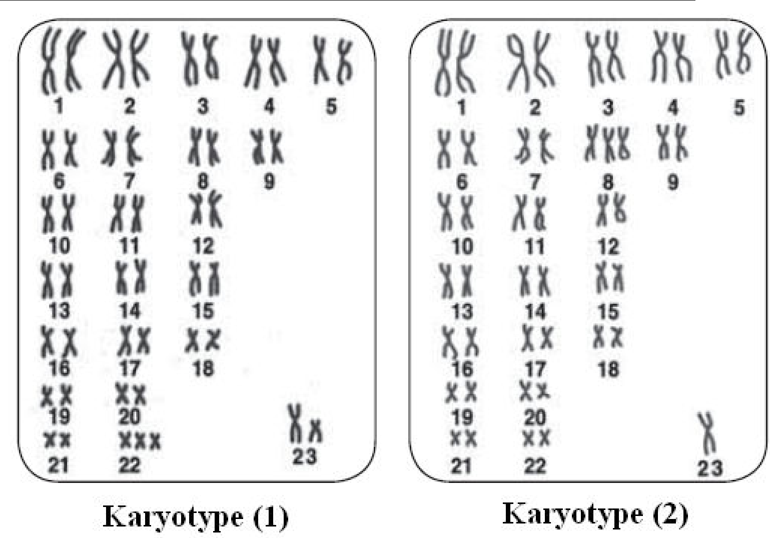
9- Diagram which represents hereditary data which explains how a certain trait is inherited, and used in tracing different hereditary traits

10- A method used to recognize a person by the comparison of his DNA sequences

3- Write short notes about

1- Sex-linked traits
2- Sex-influenced traits
3- Sex- limited traits
4- Turner's syndrome
5- Klinefelter's syndrome
6- Down syndrome
7- Genome
8- DNA fingerprint

4- Study the following figure and answer the questions



Karyotype (1) Karyotype (2)

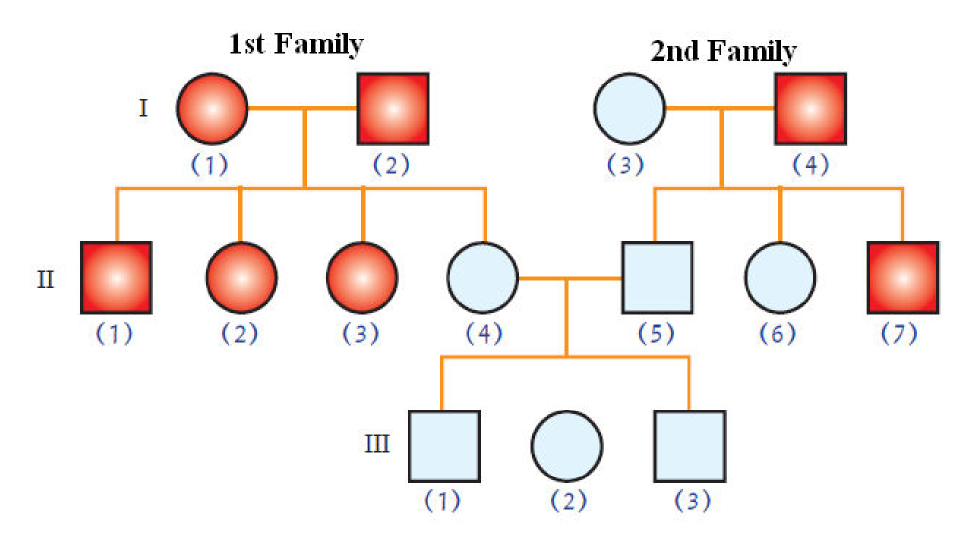
1- What is the number of chromosomes in karyotypes (1) and (2)?

2- What are the sexes of the individuals carrying karyotypes (1) and (2)?

3- What is the name, causes and symptoms of the abnormal condition in karyotype (1)?

4- What is the name, causes and symptoms of the abnormal condition in karyotype (2)?

5- The following pedigree chart describe the ability to roll tongue trait, answer the questions



1- Is this trait dominant or recessive? Why?

2- What are the genotypes of the following individuals

I (1)

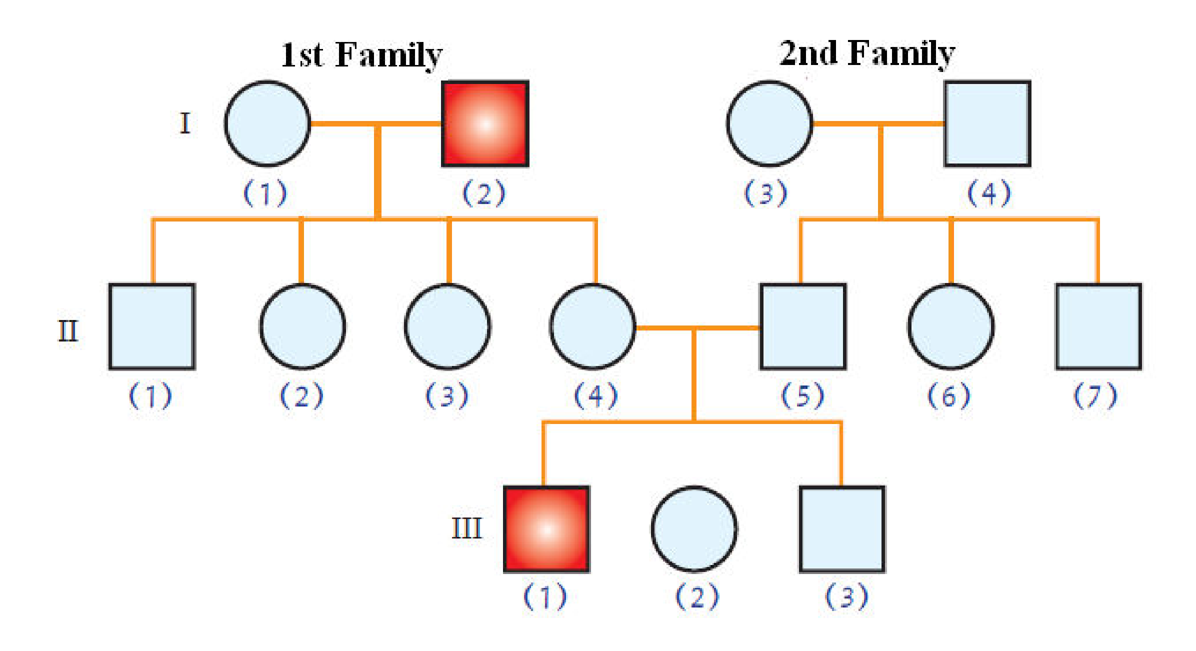
I (3)

II (3)

II (5)

III (1)

6- The following pedigree charts describe the inheritance of Hemophilia trait, answer the following questions



1- Is this trait dominant or recessive?

2- Write the genotypes of the following individuals

I (1)

I (2)

II (1)

II (5)

III (1)

The Answers

1- Choose the correct answer

1- XY+44

2- XX + 44

3- XXY + 44

4- XO +44

5- Y + 23

6- Klinefelter's syndrome

7- Turner's syndrome

8- Down syndrome

9- Sex-linked

10- Sex-linked

11- All males

12- Sex-linked

13- Sex-limited

14- Albinism

15- Alec Jeffreys

2- Write the scientific term

1- Klinefelter's syndrome
2- Turner's syndrome
3- Down syndrome
4- Sex-linked chromosomes
5- Sex-influenced chromosomes
6- Hemophilia
7- Sex-limited traits
8- Albinism
9- Pedigree chart
10- DNA fingerprint

4- Study the following figure and answer the questions

1- Karyotype (1): 47 chromosomes – Karyotype (2): 45 Chromosomes

2- Karyotype (1): Male – Karyotype (2): Female

3- Name: Down syndrome
Cause: Fertilization of a gamete having a complete pair of chromosomes 21
Symptoms: Mental retardation – Delayed growth – Oval face – Narrow eyes – Short stature – Small ears – Flat head back – Short fingers and toes

4- Name: Turner's syndrome
Cause: Fertilization of an abnormal ovum (XO+22) by a sperm (X+22)
Symptoms: Short stature – Inability to hit puberty – Congenital disorders in heart and kidneys

5-

1- Rolling tongue trait is dominant because it appeared in all members of 1st generation in the first family at ratio 100%, and 2nd generation at ratio 75%

2-
I (1) → Bb
I (3) → bb
II (3) → BB or Bb
II (5) → bb
III (1) → bb

6-

1- Recessive

2-
I (1) → AA
I (2) → aa
II (4) → Aa
II (5) → Aa
III (1)→ aa

General test on chapter (3)

Answer four questions only

Question (1)

A- Choose the correct answer

1- The points of connection of internal chromatids in homologous chromosomes pairs is called ……….

A- Chiasma   B- Chromosome   C- Centromere   D- Centrosome

2- In gametes, chromosomes which didn't undergo crossing over are called ….

A- New chromosomes   B- Building chromosomes   C- Parental chromosomes

D- Chromatids

3- When a sound male and a female infected with colour blindness marry, the appearance of this case will be in …………..

A- All males   B- All females   C- Half the males   D- Half the females

4- Blood group which is know as "Universal donor" is……

A- A   B- O   C- AB   D- B

5- Trait of flower colour of sweet pea plant is an example on ……….

A- Lack of dominance   B- Alleles multiplicity   C- Complementary genes

D- Lethal genes

B- Give reasons for

1- Turner's syndrome affects females only

2- The importance of blood groups

3- The importance of crossing over phenomenon

4- Colour blindness is more common in males than females

Question (2)

A- Write the scientific term

1- Genes which interact with each other causing the appearance of a hereditary trait.

2- A form of inheritance in which no genes dominate over the opposite one, but they interact forming new trait

3- chemical substances which exist on the surfaces of red blood cells, they play an important role in blood transfusion process.

4- Genetic disorder caused by the decrease of chromosome (X) in some females (XO+44)

5- Genetic disorder caused by the existence of an additional chromosome in chromosome pair (21)

B- What happens when

1- Breeding two yellow mice (Yy)

2- A sperm (Y+22) fertilizes an abnormal ovum (XX+22)

3- Two sweet pea plants with white flowers whose genotypes are (aaBB) and (AAbb) copulate (first and second generations)

4- Transfusing blood from a man of group (AB) to another one of group (A)

Question (3)

A- Match

(A)	***(B)***
1- Flower colour of sweet pea plant	*A- Lack of dominance*
2- Colour blindness in human	*B- Lethal genes*
3- Yellow colour of mice	*C- Complementary genes*
4- Flower colour of four o'clock plant	*D- Sex-linked traits*
5- Milk production in females	*E- Sex-influenced traits*
	F- Sex-limited traits

B- Write short notes about

1- Chromosomal theory

2- Rhesus factor

3- Pedigree

4- Sex-limited traits

Question (4)

A- Correct the underlined words

1- The genetic disorder caused by extra (X) sex chromosome in males is Down syndrome

2- DNA fingerprint was discovered by Thomas Morgan

3- Hemophilia is an example on sex-influenced traits

4- The appearance of chlorophyll is affected by the factor of temperature

5- The ratio of 2^{nd} generation in case of complementary genes is 1:3:3:9

B- Compare between

1- Blood types (A) and (B)

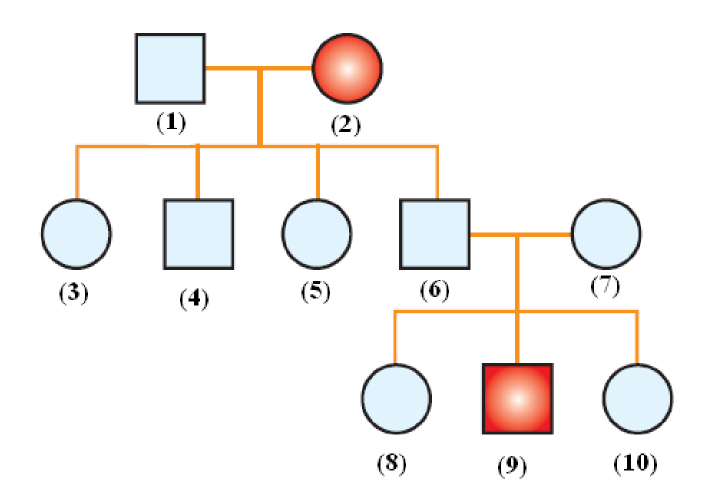
2- Lethal and complementary genes

3- Klinefelter's and Turner's syndrome

4- Antigens a and anti-a

Question (5)

A- The following figure describes the pedigree chart for the trait of freckles presence , answer the questions



1- Is this trait dominant or recessive? Why?

2- What are the probable genotypes of individuals (1), (2), (6), (7), (9)

Solution

Question (1)

A- Choose the correct answer

1- Chiasma

2- Parental chromosomes

3- All males

4- O

5- Complementary genes

B- Give reasons for

1- Because Turner's syndrome is caused when an abnormal ovum with no X chromosomes (O+22) is fertilized by a sperm (X+22), which forms a female zygote of Karyotype (XX+44).

2- Because they :-

- Solve problems of the determination of paternity (parents of children) and pedigree of children (blood groups denies pedigree but don't prove it)

- Determine blood transfusion processes between individuals.

- Are used in the study of human races classification and evolution

3- Because it causes the variation of hereditary traits of the members of same species, which helps them in the adaptation with environment conditions, and the development and continuation of their life.

4- Because colour blindness trait gene is carried on one (X) sex chromosome in males, while it has two genes carried on (XX) sex chromosomes in females. so colour blindness is more common in men because they should have only one recessive gene to be infected with colour blindness .

<u>Question (2)</u>

A- Write the scientific term

1- Complementary genes

2- Lack of dominance

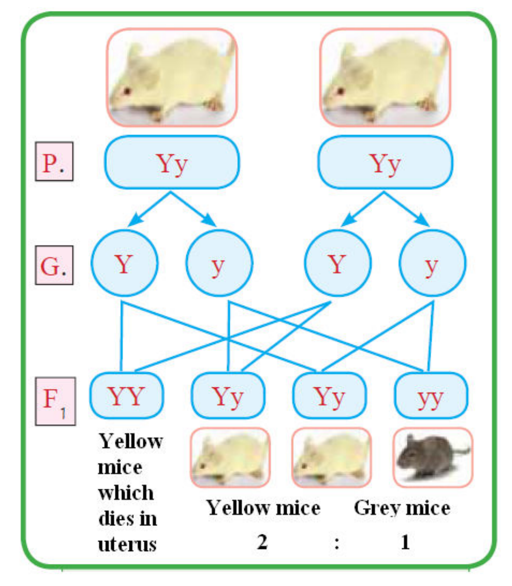
3- Antigens

4- Turner's syndrome

5- Down syndrome

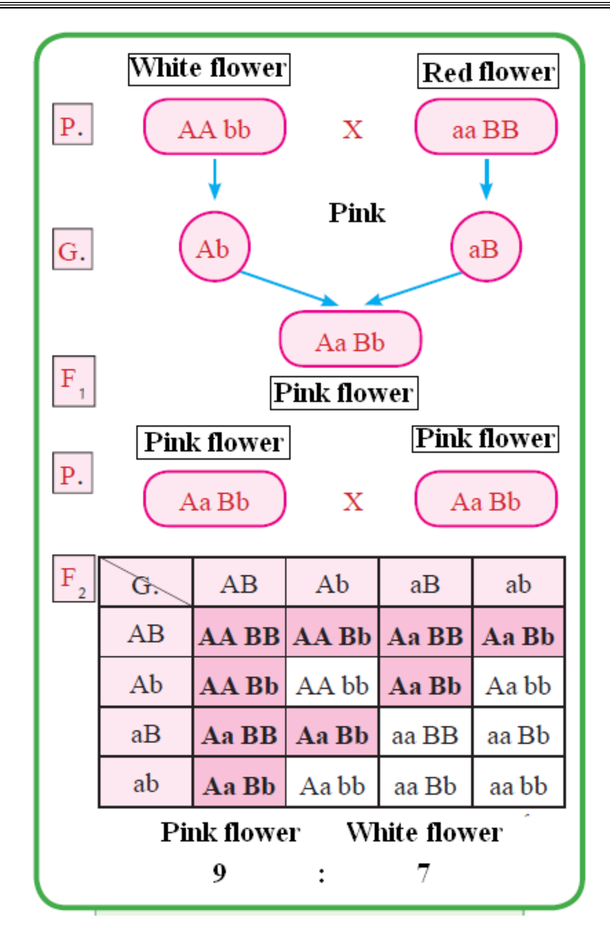
B- What happens when

1- Hybrid yellow and black mice are produced at ratio 2:1 respectively, pure yellow mice (YY) - which represent 25% of the generation – die in uterus before being born.



2- This causes Klinefelter's syndrome, which affects males and make them infertile.

3- 100% pink flowers are produced in the first generation, while both pink and white flower appear in the second generation at ratio 9:7



G.	AB	Ab	aB	ab
AB	**AA BB**	**AA Bb**	**Aa BB**	**Aa Bb**
Ab	**AA Bb**	AA bb	**Aa Bb**	Aa bb
aB	**Aa BB**	**Aa Bb**	aa BB	aa Bb
ab	**Aa Bb**	Aa bb	aa Bb	aa bb

4- This will break red blood cells of the recipient person because his blood produces anti-b for antigens-B of blood group (AB), which causes shivering in body, chest pain, blueness, irregular heartbeat, headache, low blood pressure

Question (3)

A- Match

1- C 2- D 3-B 4-A 5-F

B- Write short notes about

1- Scientists Boveri and Sutton put chromosome theory in 1902, which states that:-

1- Chromosomes exist in somatic cells in the form of homologous pairs (2n)
2- Gametes contain half the no. of chromosomes in somatic cells as a result of meiotic cell division; where homologous pairs get separated from each other forming two identical groups
3- Each pair of chromosomes acts independently when transferring to gametes.
4- After fertilization process, the normal number of chromosomes (2n) comes back
5- Each chromosome carries hundreds of genes.

2- Rhesus factor is a kind of antigens which exist on the surfaces of red blood cells of 85% of humans, its inheritance is controlled by 3 pairs of genes which exist on one chromosome pair.

3- Hereditary data represented in the form of chart diagram which explains how a certain trait is inherited, and used in tracing different hereditary traits

4- They are traits which appear in only one of the two sexes due to the difference of hormones, such as the growth of beard trait in men and milk production trait in women.

Question (4)

A- Correct the underlined words

1- Klinefelter's syndrome

2- Dr. Alec Jeffreys

3- Milk production trait in women

4- Light

5- 7:9

B- Compare between

Blood group (A)	***Blood group (B)***
- It has antigens-a - It has antibodies (anti-b) - Its genotype is AA or AO - Receives blood from groups (A), (O) - Gives blood to groups (A) and (AB)	*- It has antigens-b - It has antibodies (anti-b) - Its genotype if BB or BO - Receives blood from groups (B), (O) - Gives blood to groups (B), (AB)*

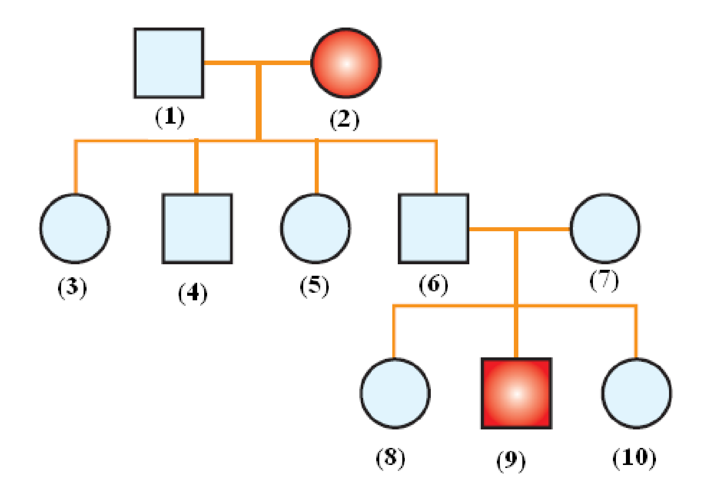
Lethal genes	***Complementary genes***
- They are genes which cause the death of living organisms if they are present in pure form because they stop its biological processes Ex. Yellow colour of mice trait	*- They are genes which interact together forming new trait Ex. Flower colour of sweet pea plant*

Klinefelter's syndrome	***Turner's syndrome***
- Its karyotype is (XXY+44) - Caused due to the fertilization of an abnormal ovum (XX+22) by a sperm (Y+22) - If affects males only - It causes infertility, tall stature, ..etc	*- Its karyotype is (XO+44) - Caused due to the fertilization of an abnormal ovum (O+22) by a sperm (X+22) - If affects Females only - It causes inability to attain puberty*

Antigens-a	*Antibodies-a*
They exist in blood groups (A) and (AB)	*They exist in blood groups (B) and (O)*

Question (5)

A- The following figure describes the pedigree chart for the trait of freckles presence , answer the questions



1- This trait is recessive because it disappeared in all members of 1st generation

2-

(1) AA

(2) aa

(6) Aa

(7) Aa

(9) aa

Principles of classification of living organisms

Definitions

Taxonomy (Classification): *The science which studies the arrangement of living organisms according to their similarities and differences*

Species: *A group of individuals having the same morphological characteristics which interbreed producing similar fertile individuals*

Dichotomous key: *A series of characteristics arranged in pairs which helps the user determine the species of an unknown species*

Give reasons for

1- The scientific importance of taxonomy (classification)
Because it deals with the arrangement of living organisms according to their differences and similarities, which facilitates their study.

2- The formation of tigons
Due to the interbreed of a female lion and male tiger

3- The formation of mules
Due to the interbreed of a male donkey and female horse

4- Neither tigons nor mules are species
Because both of them are infertile and cannot produce new fertile individuals, as they are resulted from the crossing of organisms of different species

5- The importance of binomial system of naming living organisms
Because it gives each organism a special scientific name, which overcame the problem of the difference of its names in different languages.

6- In binomial system, organisms names are derived from Latin language
Because Latin is an old language not spoken by people, which protects it from change or modification

7- The importance of dichotomous key
Because it helps us determine the species of an unknown organism through its characteristics

What happens when

1- A female lion and male tiger interbreed (cross)
Tigons are formed, which are organisms incapable of reproduction.

2- A female donkey and a male horse cross
Mules are formed, which are organisms incapable of reproduction

Modern classification of living organisms

Definitions

Monera: *They are prokaryotic unicellular organisms whose cell walls are free from cellulose or pectin, they are devoid of many membranous cytoplasmic organelles.*

Protista: *They are eukaryotic organisms whose structure is not complex, some of them have plastids and cell walls, and a small number of them are multicellular*

Sarcodina: *A class of Protista whose individuals move by using temporary projections form the body called pseudopodia such as Amoeba*

Ciliophora*:class of Protista whose individuals move by using cilia such as paramecium*

Flagellata: *Class of Protista whose individuals move by using flagella such as Trypanosoma*

Sporozoa: *Class of Protista whose individuals do not have methods for movement and produce spores such as Plasmodium*

Euglena: *Unicellular organisms which belong to protists and move by using flagella, they can perform photosynthesis due to the presence of green plastids*

Pyrrophyta: *Phylum of Protista whose individuals are algae which form great part of phytoplanktons which live in seas and oceans, their cells have plastids carrying red pigments.*

Fungi: *Kingdom of immobile eukaryotic living organisms whose cell walls contain chitin, they reproduce sexually and asexually and composed of filaments called Hyphae*

Hyphae (sing. Hypha): *Group of filaments which forms the mycelium of fungi*

Zygomycota: *Phylum of fungi whose Hyphae are not divided, they reproduce by the formation of spores inside sporangia*

Ascomycota: *Phylum of fungi whose Hyphae are divided by transverse barriers called septa, they produce spores inside sporangia*

Rhodophyta: *Marine weeds which are composed of filaments held together by a gelatinous (jelly-like) membrane, their cells have plastids carrying red pigments such as Polysyphonia*

Phaeophyta: *Marine weeds which are composed of simple and branched filaments, their cells have plastids carrying brown pigments such as Fucus*

Bryophyta: *They are terrestrial plants which do not have vascular tissues, they need high humidity for growth and reproduction*

Ferns: *Simple-structured plants which have vascular tissues, they live in damp lands and reproduce by spores.*

Gymnosperms (conifers):*They are vascular plants which do not form flowers and have male and female reproductive organs called cones, their seeds have no testa and their leaves are needle-shaped*

Angiosperms: *They are terrestrial plants which are differentiated into leaves, roots and stems. They form flowers which turn into fruits carrying seeds inside.*

Give reasons for

1- Cyanobacteria belong to kingdom Monera

Because:-
1- They are unicellular prokaryotic organisms
2- They live alone or in colonies
3- Their cell walls are devoid of cellulose or pectin
4- Their hereditary material is not surrounded by a nuclear membrane (doesn't have a definite nucleus)
5- Cytoplasm doesn't contain some organelles such as mitochondria, endoplasmic reticulum, plastids and Golgi bodies

2- Amoeba belongs to phylum Sarcodina in Protista

Because they move by using temporary projections from the body called pseudopodia

3- Trypanosoma is harmful for humans

Because Trypanosoma parasites on humans causing sleeping disease

4- Plasmodium is harmful to humans

Because it causes malaria disease to them

5- Pyrrophyta (Dinophlagellates) are red-coloured

Because their cells have plastids containing red pigments

6- Mushroom is from fungi

Because:-
1- They are multicellular eukaryotes
2- They are immobile (cannot move) and their cell walls contain chitin
3- They are composed of filaments called Hyphae, which accumulate forming Mycelium

7- Rhizopus nigricans is from Zygomycota
Because their Hyphae are not divided and they produce spores inside sporangia

8- Mushroom is from Basidimycota
Because its Hyphae are divided and its spores are formed inside a mace-like structure called cap

9- Corn is from plants
Because:-
1- It is a eukaryotic organism
2- its cell walls contain cellulose
3- its cells contain chlorophyll in green plastids
4- it reproduces sexually

9- Polysyphonia algae is from Rhodophyta
Because it is from marine weeds whose filaments are held together by a gelatinous membrane and its cells contain plastids carrying red pigment

10- Ricca is from Bryophyta
Because Ricca doesn't have vascular plants which transport food and water, they are small green plants which have hair for anchorage called Rhizoids

11- Vougheir belongs to ferns
Because it is differentiated into stems, leaves and roots, but doesn't form flowers of seeds. They reproduce by the formation of spores in structures on the undersurface of its leaves

12- Pinus plant belongs to gymnosperms (conifers)
Because it doesn't form flowers and has female or male reproductive organs called cones. Its seeds has not testa and it has needle-shaped leaves

13- Monocotyledons are from angiosperms
Because they are terrestrial plants which have stems, leaves and roots, and they form flowers which turn into fruits carrying seeds.

14- Banana is from monocotyledons
Because its seed has only one cotyledon, its leaves veins are parallel, its petals exist in multiples of 3, bundles of its vascular tissues are scattered through the stems and its roots are fibrous

15- Cotton is from Dicotyledons
Because its seed has two cotyledon, its leaves veins are reticulated, its petals exist in multiples of 4 or 5 , bundles of its vascular tissues are arranged across the in a ring and its roots are taproot

What happens when

1- Trypanosome parasite reaches to human blood
This will cause the infection with sleeping disease

2- Plasmodium parasite phases reach to human blood
This will cause the infection with malaria disease

3- Leaving a wet piece of bread in a damp and warm place for some days
Rhizopus nigricans fungus (bread mould) is formed, which rotten this piece of bread.

Questions

1- Choose the correct answer

1- …… was the first to classify animals into red-blooded and bloodless animals
A- Socrates B- Aristotle C- Linnaeus D- Leeuwenhoek

2- ………. put the traditional classification system
A- Aristotle B- Leeuwenhoek C- Linnaeus D- Robert Whittaker

3- ………. put modern classification system
A- Robert Brown B- Aristotle C- Charles Darwin D- Robert Whittaker

4- Kingdom …….. individuals are prokaryotes
A- Monera B- Protista C- Animalia D- Plantae

5- ……….. are prokaryotes which live in extreme environmental conditions
A- Eubacteria B- Achaeabacteria C- Rhodophyta D- Sporozoa

6- ………… is an example of Eubacteria
A- Amoeba B- Pencilium C- Nostoc D- Euglena

7- ……….. are from autotrophic bacteria
A- Nostoc B- Amoeba C- Cyanobacteria D- Paramecium

8- ……… are from heterotrophic bacteria
A- Nostoc B- Amoeba C- Cyanobacteria D- Paramecium

9- ………. moves by using pseudopodia
A- Amoeba B- Trypanosome C- Plasmodium D- Paramecium

10- …….. moves by using cilia
A- Amoeba B- Trypanosome C- Plasmodium D- Paramecium

11- …….. moves by using flagella
A- Amoeba B- Trypanosome C- Plasmodium D- Paramecium

12- ……….. causes sleeping disease in human
A- Amoeba B- Trypanosome C- Plasmodium D- Paramecium

13- ……… causes malaria in human
A- Amoeba B- Trypanosome C- Plasmodium D- Paramecium

14- ……… belong to Chrysophyta phylum – kingdom Protista
A- Amoeba B- Diatoms C- Dinophlagellates D- Euglena

15- ………. Belong to Pyrrophyta phylum – kingdom Protista
A- Amoeba B- Diatoms C- Dinophlagellates D- Euglena

16- Diatoms cell walls contain ……. Substance
A- Pectin B- Cellulose C- Silica D- Lignin

17- …………. Is from Zygomycota
A- Pencilium B- Rhizopus nigricans C- Mushroom D- Yeast fungus

18- ………. is from Ascomycota
A- Pencilium B- Rhizopus nigricans C- Mushroom D- Yeast fungus

19- ……….. is from unicellular Ascomycota
A- Pencilium B- Rhizopus nigricans C- Mushroom D- Yeast fungus

20- ……… is from multicellular Ascomycota
A- Pencilium B- Rhizopus nigricans C- Mushroom D- Yeast fungus

21- ……… is from Basidimycota
A- Pencilium B- Rhizopus nigricans C- Mushroom D- Yeast fungus

22- ……… secretes enzyme which is used in cheese industry
A- Pencilium B- Rhizopus nigricans C- Mushroom D- Yeast fungus

23- ………. is known as bread mould
A- Pencilium B- Rhizopus nigricans C- Mushroom D- Yeast fungus

24- ……… is an example of Rhodophyta
A- Polysiphonia B- Fucus C- Chlamydomonas D- Vougheir

25- Fucus algae belong to …………
A- Rhodophyta B- Chlorophyta C- Phaeophyta D- Bryophyta

26- ……….. is from unicellular Chlorophyta
A- Spirogyra B- Fucus C- Chlamydomonas D- Vougheir

27- ……….. is from multicellular Chlorophyta
A- Spirogyra B- Fucus C- Chlamydomonas D- Vougheir

28- ………. is an example of erect Bryophyta
A- Funeria plant B- Ricca C- Vougheir D- Pinus

29- ………. is an example of flat Bryophyta
A- Funeria plant B- Ricca C- Vougheir D- Pinus

30- Yeast belongs to kingdom ……
A- Animalia B- Plantae C- Protista D- Fungi

31- ……….. is from conifers
A- Funeria plant B- Ricca C- Vougheir D- Pinus

32- Vougheir is from ……..
A- Gymnosperma B- Bryophyta C- Angiosperma D- Ferns

33- ………. is from monocotyledons
A- Banana B- Pea C- Cotton D- Bean

2- Write the scientific terms

1- They are prokaryotic unicellular organisms whose cell walls are free from cellulose or pectin, they are devoid of many membranous cytoplasmic organelles.

2- They are eukaryotic organisms whose structure is not complex, some of them have plastids and cell walls, and a small number of them are multicellular

3- A class of Protista whose individuals move by using temporary projections form the body called pseudopodia

4- class of Protista whose individuals move by using cilia such as paramecium

5- Class of Protista whose individuals move by using flagella

6- Class of Protista whose individuals do not have methods for movement and produce spores

7- Unicellular organisms which belong to protists and move by using flagella, they can perform photosynthesis due to the presence of green plastids

8- Phylum of Protista whose individuals are algae which form great part of phytoplanktons which live in seas and oceans, their cells have plastids carrying red pigments.

9- Kingdom of immobile eukaryotic living organisms whose cell walls contain chitin, they reproduce sexually and asexually and composed of filaments called Hyphae

10- Group of filaments which forms the mycelium of fungi

11- Phylum of fungi whose Hyphae are not divided, they reproduce by the formation of spores inside sporangia

12- Phylum of fungi whose Hyphae are divided by transverse barriers called septa, they produce spores inside sporangia

13- Marine weeds which are composed of filaments held together by a gelatinous (jelly-like) membrane, their cells have plastids carrying red pigments such as Polysyphonia

14- Marine weeds which are composed of simple and branched filaments, their cells have plastids carrying brown pigments

15- They are terrestrial plants which do not have vascular tissues, they need high humidity for growth and reproduction

16- Simple-structured plants which have vascular tissues, they live in damp lands and reproduce by spores.

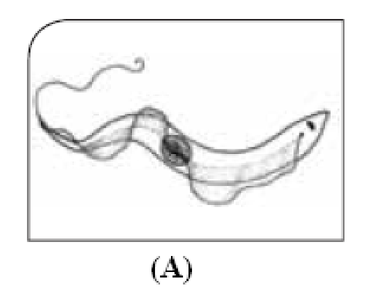
17- They are vascular plants which do not form flowers and have male and female reproductive organs called cones, their seeds have no testa and their leaves are needle-shaped

18- They are terrestrial plants which are differentiated into leaves, roots and stems. They form flowers which turn into fruits carrying seeds inside

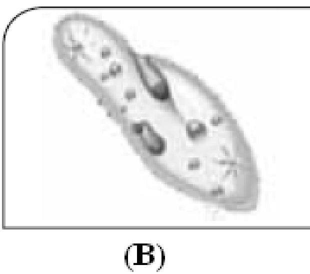
3- Write short notes about

1- Bryophytes
2- Ferns
3- Pyrrophyta
4- Achaeabacteria
5- Eubacteria

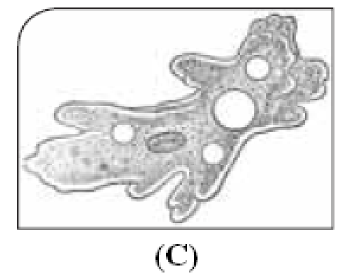
4- The following figures describe some living organisms, answer the questions



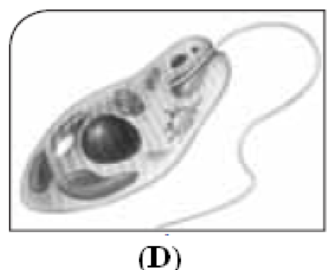
(A)



(B)



(C)



(D)

1- Determine the phyla and classes to which the previous organisms belongs
2- Mention the method of movement of the previous organisms

The Answers

1- Choose the correct answer

1- Aristotle
2- Linnaeus
3- Robert Whittaker
4- Monera
5- Archeabacteria
6- Nostoc
7- Cyanobacteria
8- Nostoc
9- Amoeba
10- Paramecium
11- Trypanosome
12- Trypanosome
13- Plasmodium
14- Diatoms
15- Dinophlagellates
16- Silica
17- Rhizopus nigricans
18- Yeast fungus
19- Yeast fungus
20- Pencilium
21- Mushroom
22- Rhizopus nigricans
23- Rhizopus nigricans
24- Polysiphonia
25- Phaeophyta
26- Chlamydomonas
27- Spirogyra
28- Ricca
29- Funeria plant
30- Fungi
31- Pinus
32- Gymnosperma
33- Banana

2- Write the scientific term

1- Monera
2- Protista
3- Sarcodina
4- Ciliophora
5- Flagellata
6- Sporozoa
7- Euglena
8- Pyrrophyta
9- Fungi
10- Hyphae (sing. Hypha)
11- Zygomycota
12- Ascomycota
13- Rhodophyta
14- Phaeophyta
15- Bryophyta
16- Ferns
17- Gymnosperms (conifers)
18- Angiosperms

3- Write short notes about

1- This phylum contains plants which doesn't have vascular tissues specialized in transporting water and food, they are called Non-vascular plants. Non vascular plants are terrestrial plants which needs high humidity to grow up and reproduce. So, they live in damp and shady places

2- Simple-structured plants, most of them are herbaceous (grass) and the rest are woody (trees). They live in damp and shady lands and exist in abundance on the walls of wells and damp valleys. They are differentiated into stems, roots and leaves. They have feather-like leaves, but do not have flowers. They reproduce by spores which exist in special structures in the undersurface of their leaves

3- These algae form a great part of phytoplanktons which live in seas and oceans. They have red colour due to the existence of red pigment along with chlorophyll. Dinophlagellates is the greatest group of this phylum, its individuals move by two flagella

4- They belong to kingdom Monera. Most of them live in extreme environmental conditions such as hot springs, environments empty of oxygen, highly-saline environments. They are different from Eubacteria in the structure of cell wall and plasma membrane

5- They belong to kingdom Monera. They have many species which spread wildly in all the environments of earth, (air, water, ground…etc)There are autotrophic bacteria (Ex. cyanobacteria), and there are heterotrophic bacteria (Ex. nostoc)

4- The following figures describe some living organisms, answer the questions

1-
(A) Trypanosome: (Kingdom Protista – Phylum Protozoa – Class Flagellata)
(B) Paramecium: (Kingdom Protista – Phylum Protozoa – Class Ciliophora)
(C) Amoeba: (Kingdom Protista – Phylum Protozoa – Class Sarcodina)
(D) Euglena: (Kingdom Protista – Phylum Euglenophyta)

2-
(A)Flagella (B) Cilia (C) Pseudopodia (D) Flagella

Kingdom Animalia

Definitions

Porifera (Sponges): *Simple-structured animals which have unsymmetrical bodies with a lot of canals and pores*

Cnidaria: *They are animals with radial symmetry and have stinging cells (cindocytes)*

Polyps: *They are phases of Cnidaria which carry out all vital processes except sexual reproduction*

Medusae: *They are phases of Cnidaria which are responsible for sexual reproduction*

Anthropoda: *Animals whose bodies are divided into a number of segments which carry some pairs of appendages.*

Mollusca: *Animals having soft bodies covered by skin tissue called the mantle, which secretes a protective calcareous shell. It may be internal or external*

Echinodermata: *Animals which have solid endoskeletons and many of them have prickles and calcareous plats in their body walls*

Chordata: *A group of animals which have structures in their back called notochords*

Viruses: *Organisms which have the characteristics of both living and non living things*

Give reasons for

1- Sponges are also called Porifera
Because the walls of their bodies have many canals and pores

2- Sponges are classified as animals although they cannot move
Because they are multicellular heterotrophic living organisms whose cells lack cell walls.

3- Cnidaria have cindocytes (stinging cells)
To protect them and help them in predation

4- Jellyfish is from Cnidaria
Because it live in the sea, it doesn't have a head, its body has a digestive cavity, its mouth is surrounded by tentacles and it has cindocytes for protection and predation

5- Hydra belongs to class hydrozoa of Cnidaria
Because in its life cycles, polyps dominate over Medusae

6- Jelly fish belong to class scyphozoa
Because they spend most of their life in medusa stage

7- Sea anemone belongs to class Anthozoa
Because its doesn't have Medusae stage and resembles flowers in shape

8- Planaria worm belongs to phylum Platyhelmenthes
Because it has flat body which have lateral symmetry and composed of 3 layers of tissues

9- Bilharzias worm belongs to Trematoda class
Because they parasite on humans causing dangerous diseases

10- Falaria (or Ascaris) worm belongs to phylum nematoda
Because it has round (cylindrical) shape and its alimentary canal has two openings: mouth – anus.

11- Shrimps belong to Curstacea
Because their bodies are divided into two parts (Cephalothorax – abdomen), their Bodies are covered with chitinous cuticle and breathe by gills

12- Spiders are from arachnids
Because their bodies are divided into two parts (Cephalothorax – abdomen), they have four pairs of legs for movement and simple eyes

13- Ants are from insects
Because their bodies are divided into three parts (Head – thorax – abdomen), they have complex eyes and three pairs of legs for movement

14- Caterpillar is from Myriapods
Because they have numerous legs (44 legs)

15- Snails are from Mollusca
Because they have soft bodies covered with calcareous shells and muscular feet for movement. They have an organ resembling tongue called Radula

16- Oyster is from Bivalvia class of Mollusca
Because its shell is composed of two hinged parts, it lives in water and breathe by gills

17- Squids are from cephalopods of Mollusca
Because part of their feet are modified to tentacles which exist in the head away from the rest of the body.

18- Starfish is from Echinodermata
Because its body is not segmented and has solid endoskeleton, it is star-shaped, its body has two sides (Oral side – aboral side) and it reproduces asexually by regeneration

19- Sea urchin belongs to class Echinoidea
Because They are animals which do not have arms, but their bodies are covered with prickles (for movement and protection). They have five sharp peak-shaped teeth used in fragmentation and chewing of food.

20- The importance of vertebral column in vertebrata sub-phylum individuals
Because it surrounds and protects the spinal cord

21- Lampreys belong to class Agnatha
Because:-
1- They are fish which have a circular mouth resembling funnel, it has many teeth and no jaws
2- They have thin bodies resembling those of snakefish
3- They do not have double fins

4- They have cartilaginous skeletons
5- They are parasites which stick to big fish through their mouths, as they fix themselves to those fish by their teeth. They bite their meat by their rough tongues which resemble files

22- Shark fish belong to class Chondrichthyes
Because:-
1- They are aquatic fish with cartilaginous endoskeleton
2- Their mouths are located in the abdomen and has two jaws carrying some rows of teeth which help her in predation
3- They have double fins
4- Their bodies are covered with scales resembling teeth
5- They have air bladders in their bodies for floating on the surface of water
6- Their gill opening are not covered
7- They are unisexual (Sexes are separate), and fertilization is internal

23- Bolty fish is from Osterichthyes
Because:-
- They have bony endoskeletons, and their mouths are located in the body front
- They have single and double (paired) fins
- Their bodies are covered with bony scales
- Their gill openings are covered with gill cover
- They are unisexual (sexes are separate) and fertilization is external

24- Salamanders belong to class Amphibia
Because:-
1- They are cold-blooded animals
2- They are have four limps and have five fingers (pentadactyl)
3- They are unisexual (sexes are separate), and fertilization is external
4- In embryonic stages, they live in water and breathe by gills. The adult stage live on land and breathe air by lungs and skin

25- Chameleons belong to class Reptilia
Because:-
1- They are cold-blooded animals
2- Body is formed from four regions: Head – Neck – Trunk – Tail
3- They have four limbs (Quadripartite) and weak five fingers (pentadactyl). Each finger ends with a horny claw
4- Some reptile doesn't have limbs and move by creeping (Ex. snakes)
5- They breath air by lungs
6- Sexes are separate (unisexual) and fertilization is internal
7- They lay eggs with skinny or calcareous peels

8- Skins are dry and covered by thick horny scales, which may be horny plates

26- Ostriches are from birds (Aves)
Because:-
1- They are warm- blooded animals
2- Their bodies are covered with feather
3- They have four limps, the two forelimbs are modified to wings for flying, and each hind limb has four fingers with horny claws for climbing, movement, predation or swimming
4- Their bones are light and hollowed, sternum bone (a bone in the chest) is flat to fix the strong chest muscles which move the wings during flying
5- They breathe air by lungs, and their bodies have air sacs which stores additional air quantity during flying
6- Sexes are separate (unisexual) and fertilization is internal, they lay eggs

27- Lions are from mammals (belong to class Mammalia)
Because:-
1- They are hot-blooded animals
2- Their bodies have 4 parts: Head – Neck – Chest (Thorax) – Abdomen
3- Their skins are covered with hair
4- They have four polydactyl (five- fingered) limbs with nails, claws or hooves
5- They have differentiated non-similar teeth (Molars – Tusks – Incisors)
6- Sexes are separate (unisexual) and fertilization is internal
7- Most of them give birth, and they have mammary glands which secrete milk for babies
8- They breathe by lungs

28- Duck-pilled platypus belongs to subclass Prototheria
Because they do not give birth, but they lay eggs. Babies feed on milk secreted from mammary glands on the abdomen of mother. They have cloacal opening through which wastes and eggs emerge

29- Duck-pilled platypus is the intermediate link between birds and mammals
Because it lays eggs and do not give birth (birds characteristics), but its babies feed by suckling the milk secreted from mammary glands on its abdomen (mammals characteristic)

30- Kangaroo belongs to Methatheria
Because it gives birth to not fully-developed babies, so it keeps them inside their pouch, where they suckle the milk secreted from its mammary glands until they become fully developed

31- Kangaroo puts his baby in a pouch
Because young born is not fully developed, so it is kept inside a pouch where its suckle the milk secreted from its mammary gland, until it becomes fully developed

32- Armadillo is a mammal which belongs to order Edentata
Because it doesn't have any teeth and have strong curved claws

33- Hedgehog is a mammal which belongs to order Insectivora
Because it feeds on insects and its front teeth are extended like pincers for predation

34- Dogs are mammals which belong to order Carnivora
Because they feed on meat, their front molars are sharp and back molars are broad and crushing and they have sharp and curved claws

35- Zebras are mammals which belong to order Perissodactyla
Because each limb has an odd number of fingers, which are covered with hooves. They also have large teeth for crushing food

36- Camels are mammals which belong to order Artiodactyls
Because each limb of it has an even number of fingers, which are covered with hooves.

37- Dolphins are mammals although they live in water
Because they feed their babies with milk secreted from mammary glands and they also have lungs for breathing atmospheric air

38- Mice are mammals which belong to order rodentia
Because they have a pair of jaws in each of the upper and lower jaws. They also have short ears and long tails

39- Rabbits are mammals which belong to order lagomorpha
Because they have two pairs of incisors in the upper jaw and one pair in the lower jaw. They also have long ears and short tails

40- Bats are mammals although they can fly
Because they give birth and have mammary glands

41- Viruses has the characteristics of both living and non living things
Non living things characteristics in viruses :-
- They do not have any cell structures
- They appear in a crystalline form
- They cannot perform any vital processes outside host cell

Living organisms characteristics in viruses:-

- They have DNA or RNA

- They can multiply and reproduce inside host cell

42- Viruses are obligatory parasites

Because they cannot reproduce unless the are inside host cell

43- It is hard to detect Viroids in infected cells

Because Viroids do not destroy the cells they parasite like viruses

44- Viroids are harmful to plants

Because some Viroids cause diseases to plants such as pale cucumber

Questions

1- Choose the correct answer

1- ……… animal belongs to phylum Porifera

A- Lampreys B- Sponges C- Jellyfish D- Bats

2- Animals of ……… phylum has stinging cells

A- Chordata B- Platyhelmenthes C- Cnidaria D- Annelida

3- In the life cycle of ……., polyps dominate over Medusae

A- Hydra B- Jellyfish C- Sea anemone D- Coral reef

4- In the life cycle of ……., Medusae dominate over polyps

A- Hydra B- Jellyfish C- Sea anemone D- Coral reef

5- Planaria worm belongs to class ……. of phylum Platyhelmenthes

A- Turbellaria B- Trematoda C- Cestoda D- Annelida

6- Ascaris worm belongs to ……… phylum

A- Nematoda B- Platyhelmenthes C- Annelida D- Anthropoda

7- Craps are from ………

A- Crustaceans B- Insects C- Arachnids D- Myriapods

8- Caterpillar is from ……..

A- Crustaceans B- Insects C- Arachnids D- Myriapods

9- Bees belong to ………..

A- Crustaceans B- Insects C- Arachnids D- Myriapods

10- Scorpions belong to ……….

A- Crustaceans B- Insects C- Arachnids D- Myriapods

11- ……….. are animals whose shells are composed of two hinged parts
A- Octopus B- Mussel C- Slugs D- Squids

12- Sea urchin belongs to ……… class of Echinodermata
A- Asteroids B- Echinoidea C- Holothuroidea D- Turbellaria

13- …….. is from cartilaginous fish
A- Bouri B- Bolty C- Shark D- Shrimps

14- ……… are from amphibians
A- Frogs B- Geckos C- Jerboa D- Snakes

15- Fetuses of ……….. phylum have notochords
A- Chordata B- Porifera C- Mollusca D- Anthropoda

16- ……….. is from Eutheria
A- Platypus B- Kangaroo C- Lions D- Chameleons

17- ……….. is from Prototheria
A- Human B- Lions C- Platypus D- Kangaroo

18- ……… is an animal which lays eggs and has mammary glands
A- Platypus B- Kangaroo C- Lions D- Chameleons

19- …….. animals have no teeth
A- Lampreys B- Lions C- Vultures D- Armadillo

20- Sloth belongs to ………. order of Mammalia
A- Edentata B- Chiroptera C- Cetacea D- Primates

21- ………….. have an even no. of fingers in each limb
A- Rhinoceros B- Horses C- Donkeys D- Sheep

22- Zebras belong to ………… order of Mammalia
A- Artiodactyla B- Chiroptera C- Perissodactyla D- Primates

23- …………. animals belong to Rodentia order
A- Rats B- Rabbits C- Bats D- Flies

24- Elephants belong to ………. Order
A- Edentata B- Chiroptera C- Proboscidea D- Primates

2- Write the scientific term

1- They are animals with radial symmetry and have stinging cells (cindocytes)

2- They are phases of Cnidaria which carry out all vital processes except sexual reproduction

3- They are phases of Cnidaria which are responsible for sexual reproduction

4- Animals whose bodies are divided into a number of segments which carry some pairs of appendages.

5- Animals having soft bodies covered by skin tissue called the mantle, which secretes a protective calcareous shell. It may be internal or external

6- Animals which have solid endoskeletons and many of them have prickles and calcareous plats in their body walls

3- Compare between

1- Cartilaginous and bony fish
2- Insects and arachnids
3- Annelida and Nematoda
4- Birds and reptiles

4- Classify the following living organisms

1- Spider
2- Jellyfish
3- Bilharzias worm
4- Octopus
5- Bean

The Answers

1- Choose the correct answer

1- Sponges
2- Cnidaria
3- Hydra
4- Jellyfish
5- Turbellaria
6- Nematoda
7- Crustaceans
8- Myriapods
9- Insects
10- Arachnids
13- Shark
14- Frogs
15- Chordata
16- Lions
17- Platypus
18- Platypus
19- Armadillo
20- Edentata
21- Sheep
22- Perissodactyla

11- Mussel *23- Rats*

12- Echinoidea *24- Proboscidea*

3- Compare between

1- Cartilaginous and bony fish

Cartilaginous fish	***Bony fish***
- They have cartilaginous endoskeletons *- Their bodies are covered with teeth-like scales* *- Their gill openings are not covered with gill cover* *- The fertilization is internal* ***Ex.*** *Whiptail stingray – Shark fish*	*- They have bony endoskeletons* *- Their bodies are covered with bony scales* *- Their gill openings are covered with gill covers* *- The fertilization is external* ***Ex.*** *Bolty fish – Bouri fish*

2- Insects and arachnids

Insects	***Arachnids***
- Their bodies are divided into three parts (Head – thorax – Abdomen) *- They have 3 pairs of legs* *- They have complex eyes* ***Ex.*** *Bees – Ants*	*- Their bodies are divided into two parts (Cephalothorax – Abdomen)* *- They have 4 pairs of legs* *- They have simple eyes* ***Ex.*** *Spiders – Scorpions*

3- Annelida and Nematoda

Annelida	***Nematoda***
- They have round cylindrical shapes *- Their bodies are divided into rings* *- Some of them are unisexual, others are hermaphrodite* ***Ex.*** *Earth worms*	*- They are ring-shaped* *- Their bodies are formed from 3 layers* *- They are unisexual* ***Ex.*** *Ascaris worm – Falaria worms*

4- Birds and reptiles

Birds	***Reptiles***
- Warm-blooded animals *- They have four limbs, forelimbs are modified to wings and hind-limbs have 4 fingers each* ***Ex.*** *Ostriches - Vultures*	*- Cold-blooded animals* *- they have four limbs with 5 weak fingers, some of them don't have limbs are move by creeping* ***Ex.*** *Snakes - Chameleons*

5- Classify the following organisms *See classification dictionary page*

General test on chapter (4)

Answer four questions only

Question (1)

A- Choose the correct answer

1- ………. put the traditional classification system

A- Aristotle B- Leeuwenhoek C- Linnaeus D- Robert Whittaker

2- Diatoms cell walls contain ……. Substance

A- Pectin B- Cellulose C- Silica D- Lignin

3- …………. Is from Zygomycota

A- Pencilium B- Rhizopus nigricans C- Mushroom D- Yeast fungus3.

4- Ascaris worm belongs to ……… phylum

A- Nematoda B- Platyhelmenthes C- Annelida D- Anthropoda

5- ……… is an animal which lays eggs and has mammary glands

A- Platypus B- Kangaroo C- Lions D- Chameleons

B- Give reasons for

1- Bolty fish is from Osterichthyes

2- Bilharzias worm belongs to Trematoda class

3- Neither tigons nor mules are species

4- The importance of dichotomous key

5- Amoeba belongs to phylum Sarcodina in Protista

Question (2)

A- Write the scientific term

1- They are terrestrial plants which are differentiated into leaves, roots and stems. They form flowers which turn into fruits carrying seeds inside.

2- They are animals with radial symmetry and have stinging cells (cindocytes)

3- Group of filaments which forms the mycelium of fungi

4- Marine weeds which are composed of simple and branched filaments, their cells have plastids carrying brown pigments

5- They are terrestrial plants which do not have vascular tissues, they need high humidity for growth and reproduction

B- What happens when:-

1- A female donkey and a male horse cross

2- Trypanosome parasite reaches to human blood

3- Leaving a wet piece of bread in a damp and warm place for some days

4- Plasmodium parasite phases reach to human blood

Question (3)

A- Match

(A)	*(B)*
1- Eukaryotic heterotrophic organisms whose bodies are composed of filaments forming Mycelium	*A- Mammals*
2- Plants which reproduce by cones and their seeds have no testa	*B- Porifera*
3- Warm-blooded animals whose bodies are covered with feather	*C- Amphibia*
4- Cold-blooded animals whose embryonic stages breathe by gills and adults breath air by lungs	*D- Birds*
5- Simple-structured animals with pores and canals in their bodies	*E- Conifers*
	F- Fungi

B- Write short notes about

1- Bryophytes
2- Ferns
3- Pyrrophyta
4- Achaeabacteria

Question (4)

A- Correct the underlined words

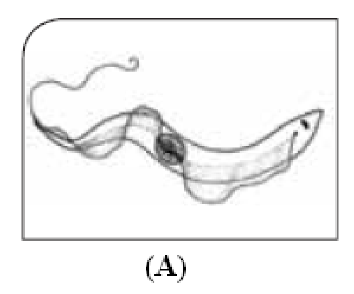
1- Carl Linnaeus put the modern classification system in 1969
2- Phylum is composed of a group of families
3- Amoeba causes sleeping disease
4- Jellyfish belongs to Eutheria order of Mammalia
5- Gecko is from insects

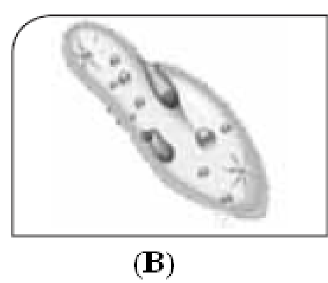
B- Compare between

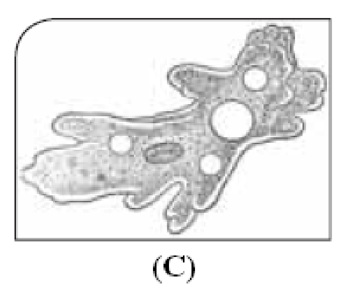
1- Cartilaginous and bony fish
2- Insects and arachnids
3- Annelida and Nematoda
4- Monocotyledon and Dicotyledons

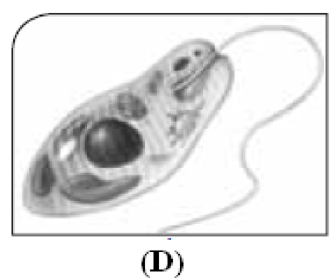
Question (5)

(A) The following figures describe some living organisms, answer the questions


(A)


(B)


(C)


(D)

1- Determine the phyla and classes to which the previous organisms belongs
2- Mention the method of movement of the previous organisms

(B) classify the following living organisms:-

1- Spider
2- Human

Questions on

Chromosomes and Genetic Information

1)Write the scientific term:

1-Arranging chromosome descendingly according to their size, then numerating them. [................................]

2-An organelle consists of nucleic acid DNA and protein.

[................................]

3-When crossing 2 individuals differ in 2 pairs or more of allelomorphic "characteristics, the 2 characteristics of each pair of them are inherited independently. [...............................]

4- A sequence of nucleotide on DNA molecule represents a code of a certain proteinresponsible for appearance of a specific trait.

[...............................]

5-Cells contain half number of chromosomes .

[..................................]

6-Cells contain the whole number of chromosomes .

[..................................]

7-When crossing two pure individuals one of them has a dominant character and The other has a recessive character:

The dominant trait appears 100% in the first generation

Both the dominant and recessive traits appear in the second generation in ratio3:1.

[................................].

2)Choose the correct answer:

1-The ratio of segregation in the second generation of complete dominance is

(3:1 – 1:1 – 3:zero – 1:2:1)

2-If the genotype of a son is aa , so the genotype of the both parents is

(AA x Aa – AA x AA – Aa x aa – AA x aa)

3-Chromosomes are arranged descendingly according to ....

(number of genes they carry – type of genes they carry – their size – all the previous)

4-The characterized ratio of the second generation of law of independent assortment is ....

(3 : 1 – 2 : 1 – 9 : 3 : 3 :1 – 1 : 1)

5-The percentage of gametes genotype Dm that produced by the individual of genotype Dd mm is ……………….

(25% - 50 % - 75% - 100 %)

6-If the number of chromosomes in a cell of human skin is 23 pairs , so the number of chromosomes in a sperm is ………………….

(23 pairs – 23 – 46 pairs – 46)

3)Give reason for :

1-The pair of sex chromosome differs from the autosomes.

…………………………………………………………………………………

2-Somatic cell is symboled by (2N) whereas gamete is symboled by (N).

…………………………………………………………………………………

3-somatic cell symbolized by (2n) wherase gametes symbolized by (n).

…………………………………………………………………………………

4) Problems :

1- A crossing occurs between a red flowered pea plant (RR) and a white flowered Pea plant (rr) .

Show on genetic bases the genotype of individuals of first generation and second generation

…………………………………………………………………………………
…………………………………………………………………………………
…………………………………………………………………………………

2-If you know that the tallness gene in pea plant is dominant over the gene of shortness.

What are the possibilities of inheritance of this characteristics when crossing Occurs between a pure tall stemmed pea plant with the other short stemmed Plant. Explain on genetic bases .

…………………………………………………………………………………
…………………………………………………………………………………
…………………………………………………………………………………

3-When crossing takes place between a pea plant of yellow and smooth seeds With other plant of green and wrinkled seeds, the ratio of the resulted Characteristics is :

(a) 25% yellow and smooth seeds. (b) 25% yellow and wrinkled.
(c) 25% green and smooth seeds. (d) 25% green and wrinkled seeds

Explain on genetic bases.

…………………………………………………………………………………
…………………………………………………………………………………
…………………………………………………………………………………
…………………………………………………………………………………
…………………………………………………………………………………

Questions on

The Interaction of Genes

1)write the scientific term :

1-A blood group contains anti-a and antigen B

[………………….].

2-A blood group is devoid of antibodies and called universal reciver

[………………….].

3-Antigen in blood presents in 85% of human beings

[…………………].

4-A genetic case controlled by a pair of genes no one of them dominates over the other, but they interact together to emerge a new character.

[………………….]

5-Genes when present in pure state cause disruption of growth and ceasing of life at different stages of age to almost one fourth of offspring.

[………………….].

2)Choose the correct answer:

1- The inheritance of blood groups includes ………………….

(multiple allels - complete dominance – lack of dominance – all the previous)

2-From examples of the lack of dominance is the colours of flowers in …….. plants

(Pea flower – pea vegetable – Antirrhinum – all the previous)

3-The genotype which leads to the emergence of red colour in pea flower plant is………..

(Aa bb – Aa Bb – aa BB – aabb)

4-The percentage of negative Rhesus factor individuals is …….% among human being

(15 – 25 – 75 – 85)

5-Inheritance of fur colour of yellow mice represents a case of ……………..

(complementary genes – lack of dominance – lethal genes - linked genes)

3)Problem:

1-A man with (A) blood group married a woman with unknown blood group and she gave birth a child with (O) blood group. What are the possibilties of mother's blood group and all children?

…………………………………………………………………………………

…………………………………………………………………………………

…………………………………………………………………………………

2-What is the percentage of loss of mice when a yellow male is mated with a grey female? Explain on genetic bases

…………………………………………………………………………………

…………………………………………………………………………………

…………………………………………………………………………………

3-Show on genetic bases the phenotype and the genotype of flower colour character in pea flower plants resulted from the following crossing:

a- Aabb x aaBb. b- AaBb x aabb.

…………………………………………………………………………………

…………………………………………………………………………………

…………………………………………………………………………………

…………………………………………………………………………………

…………………………………………………………………………………

4- A man with blood group (AB) was married a woman has a blood group (O) Explain on genetic bases

……………………………………………………………………….………..

…………………………………………………………………………………...

………………………………………………………………………………..…

4)what will happen in the following cases:

1-Mating a yellow male mouse (Yy) with agrey female (yy).

………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………

2-Germinating seedlings of corn plants in a dark place .

………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………

3-Mating yellow hybride mice together.

………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………

4-Transfusion blood from (AB) blood group to (O) blood group other person.

………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………

5- Marriage of a (Rh^-) woman with a (Rh^+) man.

………………………………………………………………………………

………………………………………………………………………………

………………………………………………………………………………

5)Compare between:

1-Blood group (O) and blood group (AB)

2-Complementary genes and lethal genes.

Questions on

Sex Inheritance and Genetic Diseases

1)Write the scientific term:

1-The traits that their genes are carried on autosomes and their actions is influnced by sex hormones. [……………………]

2-A genetic case causes the inability of distingushing colours especially the red and green colours. [……………………]

3-A genetic disease arising from fertilization of abnormal ovum (22+xx) by a healthy sperm (22+Y). [……………………]

4-The traits that their emergence is restricted to one sex only due to difference in sex hormones of each sex. [……………………]

5-The traits that their genes are located on sex chromosomes X and Y and their appearance does not affected by sex hormones .

[……………………..]

2)Compare between :

1-Klinefelter's syndrome male and Down's syndrome male.

2-colour blindness disease and baldness disease.

3)Choose the correct answer:

1-The presence of 45 chromosomes in a cell of human skin indicates that this is a

case of……

(Down's syndrome – Turner's syndrome – Klinefelter's syndrome – normal female)

2-Chromosome X differs from chromosome Y in …………

(Shape – size – number of genes it carries – all the previous)|

3-The gamete responsible for sex determination in human being is the ……….

(sperm (X) – sperm (Y) – ovum (X) – number of ova)

4-The chromosomal structure of the normal ovum of human female is ………

(44+XX – 22+XX – 22+X – all the previous)

5-From examples of sex – limited traits in humans is ……………………..

(baldness – appearance of beard – colour blindness – haemophilia)|

4)Solve the following :

1-What is the result of crossing a red –eyed male Drosophila with a white –eyed female in the first and the second generation.

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

2- When a colour blinded man married a healthy woman (pure) , all of the resulted generation are healthy . explain on genetic bases.

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

3-When a healthy man married a haemophilic carrier woman the produced generation includes healthy and sick individuals. Explain on genetic bases.

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

4-A bald headed man (hybride) is mrried to a woman does not suffer frrom hair falling.explain on genetic bases.

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

5)Write short notes:

1-Sex limited traits

………………………………………………………………………………………

2-Sex influnced traits

………………………………………………………………………………………

3-Sex limited traitrs

………………………………………………………………………………………

Questions on

Principles of Living Organisms Classification

A)Write the scientific term :

1-A series of descriptions ordered in pairs , that lead the user to identify an unknownliving organism for him. [……………………………….………]

2-The highest level of classification of living organism. […………………………………………]

3-The lowest level of classification of living organisms. [……………………..……………..]

4-Arranging living organisms in groups according to similarities and differences between them to facilitate their classification. […………………………...…….]

5- A taxonomic level represents the highest group in the kingdom and consists of classes. […………………………….…..]

6-A group of living organisms having similar morphological characteristics mate with each other and produce fertile organisms similar to them […………………………………………]

B)Give reason for:

1-Tigon is not considered as a species.

…………………………………………………………………………………………

2-Biologists use the dichotomous key.

…………………………………………………………………………………………

3-Mule is not considered as a species.

…………………………………………………………………………………………

C) Choose the correct answer:

1-In the binomial nomenclature , the first name is …….

(genus – species – phylum – class)

2-…………………. Includes a number of genera .

(Family – Order – Phylum - Class)

3-The lowest taxonomic level of living organism is the ………………….

(kingdom – phylum – class – species)

4-The system of modern classification depends on definition of the ……………..

(species – order – phylum – class)

5-The taxonomic hierarchy of classification is …………………………..

-kingdom – class – family – order – phylum.

-kingdom – family – order – class – phylum.

-kingdom – phylum – class – order – family.

-kingdom – phylum – order – family – class.

D)What's meant by:

1-Species.

……………………………………………………………………………………

……………………………………………………………………………………

2-Binomal nomenaclature.

……………………………………………………………………………………

……………………………………………………………………………………

3-Dichtomus key.

……………………………………………………………………………………

……………………………………………………………………………………

4-Taxonomy.

……………………………………………………………………………………

……………………………………………………………………………………

E)what will happen in the following cases:

1-Mating between female lion and male tiger.

……………………………………………………………………………………

2-Mating between male donkey and female horse.

……………………………………………………………………………………

3-No classification of living organisms is present.

……………………………………………………………………………………

F)Write a brief account:

1-The conditions of writing the scientific names of living organisms.

……………………………………………………………………………………

……………………………………………………………………………………

Questions on

Modern Classification of Living Organisms

A)Choose the correct answer:

1-All the following organisms cause diseases to human except……………………….
(some ascomycotan fungi – Sporozoans – diatoms – flagellates).

2-Phylum protozoa divided into ………………. Classes depending on the mean of locomotion. (three – four – five – nine)

3-Trypanosoma causes …………………………… Sickness
(malaria – sleeping – dysentery – infleuenza)

4-Monocotyledon plants are characterizedby……………………………………….
(fibrous root – parallel venation of leaves – trimerous floral whorles – all the previous)

5-From the plants that contain cones is…………………………..
(maize – peas – pinus – wheat)

5-Phylum pyrrophyta is one of the phyla of kingdom…………………………..
(monera – protista – fungi – plantea)

6-From examples of brown algae is ……………………….
(Chlamydomonas – Nostoc - Polysiphonia Fucus)

7-The flowers of dicotyledon plants have ………………… whorls.
(trimerous – teteramerous – pentamerous –tetramerous or pentamerous)

8-Phylum …………… is characterized by presence of a conductive tissue to transport water and food .
(Bryophyta – Tracheophyta – phaeophyta – Rhodo phyta)

9-Pencillium fungus belongs to phylum……………………………………..
(Ascomycota – Deutoromycota – Zygomycota –Basidiomycota)

10-Plasmodium is classified into class……………………
(flagellate – Ciliophora – sporozoa – sarcodina)

11-Red algae belong to kingdom……………………………..
(Monera – protista – fungi – Plantae)

B)Give reason for:

1-Bacteria are classified to kingdom monera

………………………………………………………………………………………

………………………………………………………………………………………

2-Palm is classified as dicotyledon plants.

………………………………………………………………………………………

………………………………………………………………………………………

3-Flowering plants are called angiosperms.

………………………………………………………………………………………

………………………………………………………………………………………

4-Bean plant is classified to monocotyledon plants.

………………………………………………………………………………………

………………………………………………………………………………………

5-Algae are found in different colours.

………………………………………………………………………………………

………………………………………………………………………………………

C-Match the following

:1)

A	B
1-Mushroom	a-From dicotyledon plants.
2-Onion.	b-From red algae.
3-Fucus.	c-From brown algae.
4-Bean.	d-From monocotyledon plants.
5-Spirogyra.	e-From ascomycota.
6-Polisiphonia.	f-From diatoms
7-Penicillium.	g-From green algae.
	h-From basidiomycota.

2):

A	B
1-Nostoc.	a-is a free living organism.
2-Euglena.	b- is a protozoan organism moves by pseudopodia
3-Paramecium.	c-is a monerean organism that has economic importance for humans.
4-Plasmodium.	d-is a parasitic organism moves by flagellum.
5-Trypanosoma.	e-is a monerean organism with blue green colour.
6-Amoeba.	f- is a free living organism moves by a flagellum.
	g-is an organism causes malaria disease.

Questions on

Kingdom :Animalia

1)Write the scientific term:

1-A group of mammals that donot give birth , but they lay eggs and incubate them [……………………………….….].

2-Worms with tapered ends , unsegmented body . […………………………………..].

3-Fish that live in salty and fresh water and their gills slits covered by an operculum. […………………………………….].

4-Animals that their body is covered by feathers and their hind limbs end with 4 toes provided with claws. […………………………………….].

5-the animals that their bodies contain no vertebral column. […………………………………….]

6-Animals with radial symmetrical body provided with Cnidocytes. […………………………………….]

7-The terrestrial animals that have 4 weak limbswhich may be absent and move by crawling. […………………………………….].

8-Animals characterized by having 2 pairs of incisors in the upper jaw and one pair of incisors in the lower jaw. […………………………………….]

9-Fishes with a circular , funnel shaped mouth provided with several teeth and is jawless. […………………………………….].

10-Animals that their body is covered by hairs and their teeth are dissimilar . […………………………………….]

11-Animals that their blood flows inside blood vessels in a closed circulation to provide all body organs with Oxygen and nutirents. […………………………………….]

2)Choose the correct answer:

1-The number of pairs of legs in scorpion is …………………………

(1 – 2 – 3 – 4).

2-From animals that give birth immature youngs is……………………

(Platypus – armadillo – Kangroo – whale)

3-All of the following animals are cold blooded except ………………….

(ostrich – frog – lizard – chameleon)

4-From examples of annelids is ………………………

(Fasciola – Ascaris – Bilharizia – earth worm.)

5-Sponge animal is belongs to phylum ……………………

(Cnidaria – Porifera – Mollusca – Arthropoda)

6-From examples of echinoderms is ……………………

(Sea urchin – jelly fish – snail – prawn).

7-The body consists of two regions : cephalothorax and abdomen and is covered with chitinous cuticle in the …………………………

(Crab – Scorpion – Locust – Spider).

8-Fertilization is external in ………………………..

(Reptiles – birds – bony fish – mammals)

9-All the following are flat worms except……………….

(bilharizia –planaria – Ascaris – tape worm)

10-…………………….Are characterized by presence of notochord

(Arthropods – Mollusca – Echinodermas – Chordates).

11-The body of reptiles covered with……………………..

(Feathers – heavy hair – horny scales – bony scales).

12-Limbs may be absent in ………………………..

(reptiles - birds – amphibians – mammals)

13-All the following animals give birth except……………….

(human – platypus – kangroo – armadillo)

14-Bones of …………………….. are hollow and light.

(amphibians – reptiles – birds – mammals 0

15-All the following animals are cold blooded except……………………….

(Ostrich – frog – lizard – chameleon)

16-From higher animals that live in water…………………….

(shark – whale – prawn – bouri)

3)Compare between :

1-Insecta and Arachnida

2-Prototheria , metatheria and eutheria

3-birds and reptiles.

4-round worms and ring worms.

5-rodents and lagomorphs

4)Give reason for :

1- Sponges are classified into animals although they are immobile.

……………………………………………………………………………………

……………………………………………………………………………………

2- Ants are insects , while prawn is a crustacean animal.

……………………………………………………………………………………

……………………………………………………………………………………

3- Ascaris worm is one of nematodes , while earth worm is one of annelids.

……………………………………………………………………………………

……………………………………………………………………………………

4- Fish are ectotherms (cold –blooded) animals.

……………………………………………………………………………………

……………………………………………………………………………………

5- Presence of air bladder in bony fishes.

……………………………………………………………………………………

……………………………………………………………………………………

6- Scorpion belongs to arachids not insects.

……………………………………………………………………………………

……………………………………………………………………………………

7- Kangroo is classified to metatherian animal

…………………………………………………………………………………………

…………………………………………………………………………………………

8- The whal belongs to mammals although it lives in water.

…………………………………………………………………………………………

…………………………………………………………………………………………

9- Presence of air sacs in birds.

…………………………………………………………………………………………

…………………………………………………………………………………………

10 -Suitability of internal structure of birds for flying.

…………………………………………………………………………………………

…………………………………………………………………………………………

12-Hedgehog has interior teeth similar to the pincer.

…………………………………………………………………………………………

…………………………………………………………………………………………

13-Embryonic stages of amphibians respire by gills , while their adult stages respire by lungs and skin.

…………………………………………………………………………………………

…………………………………………………………………………………………

14-Lamprey has a circular mouth provided with rough tongue and several teeth and without jaws.

…………………………………………………………………………………………

…………………………………………………………………………………………

15-Amphibians and reptiles are cold blooded animals.

…………………………………………………………………………………………

…………………………………………………………………………………………

16-Duck billed platypus is considered a link between mammals and birds.

…………………………………………………………………………………………

…………………………………………………………………………………………

5)Cross the odd word out:

1- Hydra – sponge – Aurelia – sea anemone.

2-Snail – oyster – octopus – prawn.

3-Sea star – sea cucamber – sea urchin – jelly fish.

4-Spider – locust – mosquito – ant.

5-Lion – dog – sloth – cat.

6)Match the following:

1-

A	B
1-Jelly fish.	a-Belongs to class arachnida.
2-Bilharizia.	b-belongs to phylum echinodermata.
3-Flaria worm.	c-belongs to flat worm.
4-Earth worm.	d- belongs to phylum nematoda.
5-Scorpion.	e-belongs to phylum cnidaria.
6-Sepia.	f-belongs to phylum platyhelminthes.
7-Sea urchin.	g-belongs to phylum annelida.
	h-belongs to phylum mollusca.